FBISE

COMPUTER SC.

MODEL PAPERS & GUESS PAPERS

Faderal Board Islamabad

Presented by:

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STUDY GROUP

9TH CLASS

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GUESS PAPER & MODEL PAPER # 1

Based on Chapter # 01 (Reduced Syllabus)

FUNDAMENTALS OF COMPUTER

SECTION – A (Marks 12)

Time allowed: 20 Minutes Total marks: 12

NOTE: Section-A is compulsory. All parts of this section are to be answered on the question paper itself. It should be completed in the first 20 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q.1 Circle the correct option i.e. A / B / C/ D. Each part carries one mark.

i. **Who invented logarithm?**
A Blaise Pascal B. John Napeir
C. Charles Babbage D Herman Hollerith

ii. **Which generation of computer used transistor?**
A. 1st Generation of Computers B. 2nd Generation of Computers
C. 3rd Generation of Computers D. 4th Generation of Computers

iii. **In which generation of computer microprocessor was introduced?**
A 1st Generation of Computers B 2nd Generation of Computers
C. 3rd Generation of Computers D 4th Generation of Computers

iv. **Which of the following computer supports thousands of users at the same time?**
A Microcomputer B Minicomputer
C. Mainframe computer C Laptop computer

v. **Who is responsible for protecting information and information systems from unauthorized people in an organization?**
A. System Analyst B. Information Security Analyst
C. Network Administrator D. Hardware Engineer

vi. **Which of the following is the fastest memory?**
A. USB flash drive B RAM
C ROM D Cache

vii. **What type of software a device driver is?**
A. Application software B Business software
C. System software D. Productivity software

viii. **Which of the following is volatile memory?**
A RAM B ROM
C. USB flash drive D. Hard disk

ix. **Which software is distributed free of cost for a limited period as a trial version?**
A. Open source software B Shareware
C. Freeware D Productivity software

x. **When were IC chips developed?**
A. Early 1960s B Early 1970s
C 1980s D. 1990s

xi. **Which of the following is called the first generation computer?**
A. Abacus B. Pentium i
C. Mark I D UNIVAC

xii. **Which layout was designed to let people type as quickly as possible without jamming a**

COMPUTER SCIENCE (SSC-I)

Time allowed: 2:40 Hours Total Marks section B & C = 43

Note: Answer any nine parts form Section 'B' and attempt any two questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet-B if required. Write your answers neatly and legibly.

SECTION – B (Marks-27)

Q.2 Attempt any NINE parts. The answer to each part should not exceed 3 to 4 lines each. (9 × 3 = 27)

i. Describe Napier's Bone and Slide Rule.
ii. Compare 1st and 3rd generation computers.
iii. Differentiate between analog and digital computers.
iv. Ahmed, a class IX student is asking his father to replace his home computer CRT monitor with LCD monitor. How will you justify his demand?
v. What will happen if storage devices are removed from a computer?
vi. Differentiate between systems software and application software.
vii. How a student can use computer to improve academic performance?
viii. Give any three uses of computers in a school library.
ix. Name few house hold appliances in which microprocessor is used.
x. What are the tasks performed by operating system?
xi. What are the tasks performed by Abacus?
xii. Differentiate between Difference Engine and Analytical Engine.
xiii. What are the various tasks performed by Mark-I?

SECTION – C (Marks-16)

Note: Attempt any TWO questions. Each question carries equal marks. (2 × 8 = 16)

Q3. a. Write a short note on the second generation of computer and the technology used in it. Also write down the names of model used in second generation of computers?
b. Write a note on mainframe, minicomputer and microcomputer.
c. Explain the basic operations of a computer.

Q4. Write short note on the following.
a. Hardware Engineer
b. Network Administrator
c. Database Administrator
d. Web Designer
e. Multimedia Designer

Q5. Describe the following types of application software.
a. Productivity software
b. Business software
c. Entertainment software
d. Education software

SOLUTION OF GUESS PAPER & MODEL PAPER # 1 (Reduced Syllabus)

SECTION – A (MCQs)

i. B	ii. B	iii. D	iv. C	v. B	vi. D
vii. C	viii. A	ix. B	x. A	xi. C	xii. A

ختم نبوت ﷺ زندہ باد

عظمت صحابہ زندہ باد

السلام علیکم ورحمۃ اللہ وبرکاتہ:

معزز ممبران: آپ کا وٹس ایپ گروپ ایڈ من "**اردو بکس**" آپ سے مخاطب ہے۔

آپ تمام ممبران سے گزارش ہے کہ:

- گروپ میں صرف PDF کتب پوسٹ کی جاتی ہیں لہذا کتب کے متعلق اپنے کمنٹس / ریویوز ضرور دیں۔ گروپ میں بغیر ایڈ من کی اجازت کے کسی بھی قسم کی (اسلامی و غیر اسلامی، اخلاقی، تحریری) پوسٹ کرنا سختی سے منع ہے۔
- گروپ میں معزز، پڑھے لکھے، سلجھے ہوئے ممبرز موجود ہیں اخلاقیات کی پابندی کریں اور گروپ رولز کو فالو کریں بصورت دیگر معزز ممبرز کی بہتری کی خاطر ریموو کر دیا جائے گا۔
- کوئی بھی ممبر کسی بھی ممبر کو انباکس میں میسیج، مس کال، کال نہیں کرے گا۔ رپورٹ پر فوری ریموو کر کے کاروائی عمل میں لائے جائے گی۔
- ہمارے کسی بھی گروپ میں سیاسی و فرقہ واریت کی بحث کی قطعاً کوئی گنجائش نہیں ہے۔
- اگر کسی کو بھی گروپ کے متعلق کسی قسم کی شکایت یا تجویز کی صورت میں ایڈ من سے رابطہ کیجئے۔
- سب سے اہم بات:

گروپ میں کسی بھی قادیانی، مرزائی، احمدی، گستاخِ رسول، گستاخِ امہات المؤمنین، گستاخِ صحابہ و خلفائے راشدین حضرت ابو بکر صدیق، حضرت عمر فاروق، حضرت عثمان غنی، حضرت علی المرتضیٰ، حضرت حسنین کریمین رضوان اللہ تعالیٰ اجمعین، گستاخ اہلبیت یا ایسے غیر مسلم جو اسلام اور پاکستان کے خلاف پراپیگنڈا میں مصروف ہیں یا ان کے روحانی و ذہنی سپورٹرز کے لئے کوئی گنجائش نہیں ہے لہذا ایسے اشخاص بالکل بھی گروپ جوائن کرنے کی زحمت نہ کریں۔ معلوم ہونے پر فوراً ریموو کر دیا جائے گا۔

- تمام کتب انٹرنیٹ سے تلاش / ڈاؤنلوڈ کر کے **فری آف کاسٹ** وٹس ایپ گروپ میں شیئر کی جاتی ہیں۔ جو کتاب نہیں ملتی اس کے لئے معذرت کر لی جاتی ہے۔ جس میں محنت بھی صَرف ہوتی ہے لیکن ہمیں آپ سے صرف دعاؤں کی درخواست ہے۔
- عمران سیریز کے شوقین کیلئے علیحدہ سے عمران سیریز گروپ موجود ہے۔
- **لیڈیز کے لئے الگ گروپ کی سہولت موجود ہے جس کے لئے ویریفکیشن ضروری ہے۔**
- اردو کتب / عمران سیریز یا سٹڈی گروپ میں ایڈ ہونے کے لئے ایڈ من سے وٹس ایپ پر بذریعہ میسیج رابطہ کریں اور جواب کا انتظار فرمائیں۔ برائے مہربانی اخلاقیات کا خیال رکھتے ہوئے موبائل پر کال یا ایم ایس کرنے کی کوشش ہر گز نہ کریں۔ ورنہ گروپس سے تو ریموو کیا ہی جائے گا بلاک بھی کیا جائے گا۔

نوٹ: ہمارے کسی گروپ کی کوئی فیس نہیں ہے۔ سب فی سبیل اللہ ہے

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اللہ تبارک تعالیٰ ہم سب کا حامی و ناصر ہو

SECTION – B

Q.2 Attempt any NINE parts. The answer to each part should not exceed 3 to 4 lines each. **(9 × 3 = 27)**

I. Describe Napier's Bone and Slide Rule.

Ans: Napier's Bone:

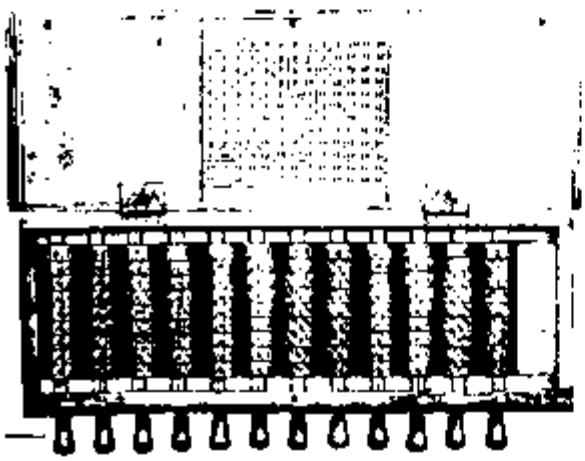
John Napier, a Scottish mathematician invented a calculating device called Napier's Bone in 1614.

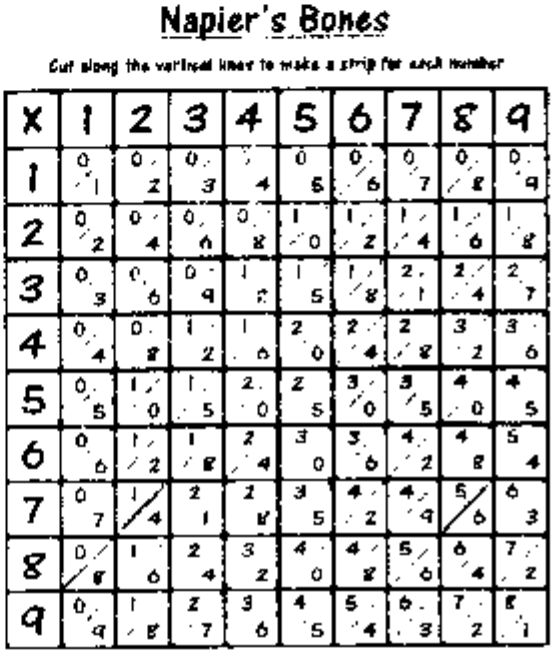
Construction:

It consisted of a wooden box containing rotating cylinders each of which had the digits from 0 to 9.

Function:

It could multiply, divide and find square roots of numbers by using simple addition and subtraction. His biggest achievement was the invention of logarithm





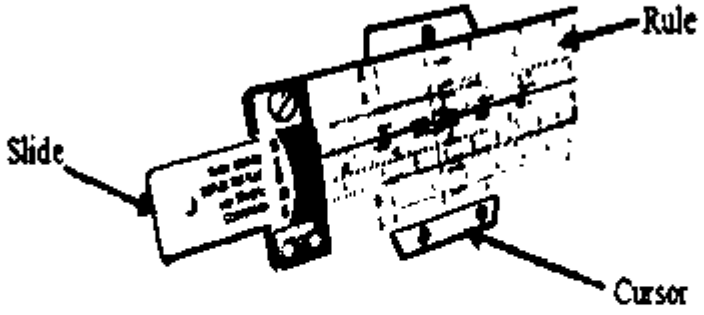
Napier's Bone

Slide Rule:

Based on the idea of logarithm, English mathematician, William Oughtred developed a device called Slid Rule in 1614.

Function: It was very useful for solving problems that involved multiplications and divisions.

Construction: It has three parts, slide, rule and a transparent sliding cursor as shown in Fig.



Slide Rule

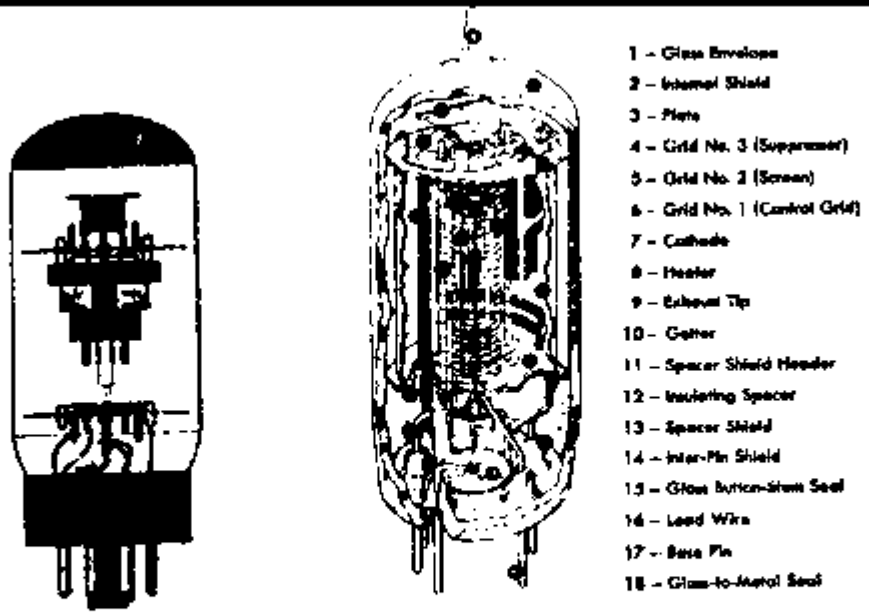
Note: Slide rule was replaced by electronic pocket calculator in the early 1970s.

ii. Compare 1st and 3rd generation computers.

Ans: First Generation Computers (1940 – 1956):

Technology used: Vacuum tubes were used in the first generation computers.

Problems arising from the use of computers Vacuum tubes:



Vacuum Tube

Features/characteristics of first generation computers:

The following are the characteristics of first generation computers.

- First generation computers used vacuum tubes.
- Speed was slow and memory was very small.
- They were huge in size taking up entire room.
- First generation computers were very expensive and unreliable.
- They consumed a lot of power and generated a lot of heat.
- Input was based on punched cards.
- Output was obtained on printouts through electric typewriter.
- Machine language was used in these computers.

Examples of first generation computers:

Some examples of first generation Mini/Mainframe computers are ENIAC, UNIVAC I, IBM 604, Mark-I and EDSAC.

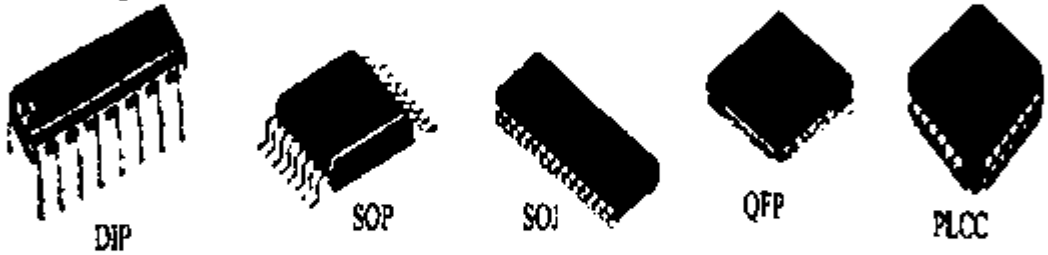
Third Generation Computers (1963 – 1971):

Technology used:

Integrated Circuits (ICs), also known as semiconductor chips were used in third generation of computers instead of transistors. IC chips were developed in early 1960s.

IC chip:

A single IC chip contains a large number of transistors. IC chips increased the power and decreased the cost of computers. Invention of IC chips was a great breakthrough in advancing computer technology. IC chips are shown in Fig.



IC Chips

Features/ characteristics of third generation computers:

The following are the characteristics of third generation of computers.

- Third generation computers used IC chips.
- IC chips improved the speed and memory of computers.
- Computers consumed less electricity, became smaller, cheaper and more reliable than second

Examples of third generation computers:

Some examples of third generation computers are Burroughs 6700, IBM System/360, System 3 and Control Data Corporation's 3300 and 6600 computers.

iii. Differentiate between analog and digital computers.

Ans: Analog Computers:

Analog computers represent and process data by measuring quantities such as voltage and current to solve a problem.

They work on supply of continuous signals as input and display output simultaneously. Analog computers are special purpose devices, designed to perform single specific task.

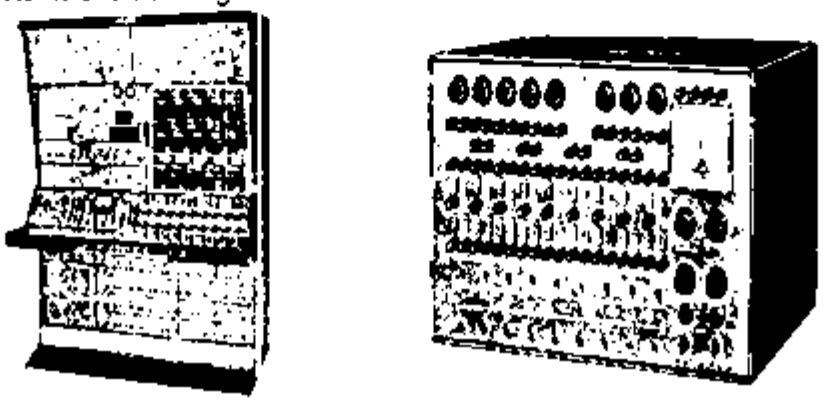
Mostly these devices are used in engineering and scientific applications.

Features/ characteristics of Analog Computers:

The accuracy of analog computers is low but they are faster in speed as compared to digital computers.

Construction:

They mainly consist of electrical devices such as resisters, capacitors, transistors, etc An analog computer with volt meter is shown in Fig.



Analog Computer

Digital Computer:

Digital computer works with digits. Everything in a digital computer is represented with binary digits 0s and 1s. It manipulates them at very fast speed. Data and instructions are fed into the digital computer through an input device in the form of 0s and 1s.

Features/ characteristics of Digital Computer:

The computer performs calculations on data according to the instructions given in a computer program. The results of calculations are displayed on monitor or printed on printer. A digital computer is shown in Fig.

Digital Computer

Digital computers can store and process large amount of information at high speed. The results produced by digital computers are reliable and accurate. Digital computers are general-purpose computers, used in various fields.

OR (Second Answer)

Ans. Difference between an analog and a digital computer:

Analog computer	Digital computer
i- An analog computer accepts data in continuous or physical form, represents it in a	**i-** A digital computer accepts data in the form of digits represents it in terms of discrete numbers and

iii-These computers have no operational state.	**iii-**These computers have only two states On (0) and off (1).
iv- Fast in processing as compare to digital computers.	**iv-** Low processing speed as compare to analog computers
v- Accuracy is less as compare to digital computers.	**v-** These computers are more accurate as compare to digital computers.
vi- These computers have small memory size	**vi-** The memory capacity is huge.
vii- These computers are used in complex scientific and mathematical calculations.	**vii-** These computers are used in scientific and technical research, business, education, healthcare, supermarkets, factories, banking, transportation, space exploration, art and music etc.
Examples: Heath Kit EC-1 an educational analog computer by USA in 1960	**Examples:** IBM PCs Apple Macintosh computers.

iv. Ahmed, a class IX student is asking his father to replace his home computer CRT monitor with LCD monitor. How will you justify his demand?

Ans: Justification of his demand:

LCDs are free from geometric image distortions at the screen edges because they are a flat matrix display where every pixel is active.

LCDs have uniform screen brightness and the screen is covered with a flexible surface that is substantially less prone to specular glare compared to a glass covered CRT monitor screen.

LCDs are flicker free, which should reduce the risks of headaches and eyestrain.

Because LCDs are smaller than CRT monitor, LCDs required little space than CRT monitor.

LCD also require lesser energy than CRT Monitors.

v. What will happen if storage devices are removed from a computer?

Ans: Storage devices are core function and fundamental component of computers. The Purpose of the memory device is to store the information and for the information retrieval. If storage devices are removed from a computer then it will not possible to store the information and information retrieval.

vi. Differentiate between systems software and application software.

Ans: System Software:

System software is a collection of programs which makes the use of computer easy and efficient. Highly experienced computer programmers develop system software

Following are the types of system software.

i. Operating system
ii. Device drivers
iii. Utility programs
iv. Language processors

Application Software:

Application software is developed for computer users to solve their problems such as preparing a letter, creating a presentation or managing a database.

Commonly used application software includes productivity software business software, entertainment software and education software

vii. How a student can use computer to improve academic performance?

Ans:

- Using computer applications increases the students' motivation for learning Management.
- Using of computer catch the attention of the students and increase their interest for learning Management.
- Using computer applications lead to the development of students' skills
- Using computer applications develops the students' process of thinking critically.
- Using computer applications creates the opportunity for students to be active in class, and not passive
- Using computer applications creates the opportunity for students to solve different case studies, to

- Using computer applications contributes to the students' engagement in the process of learning Management.

viii. Give any three uses of computers in a school library.

Ans: Uses of computers in a school library:

- Access to large amounts of information to users wherever they are and whenever they need it.
- Access to primary information sources.
- Network accessibility on Intranet and Internet.
- User-friendly interface.
- Advanced search and retrieval.
- Multiple access/ Universal accessibility.
- Integration with other digital libraries

ix. Name few house hold appliances in which microprocessor is used.

Ans: Today, microprocessor is not only used in microcomputers, they are also used in the devices including mobile phones, microwave ovens, cameras, washing machines, televisions, etc.

x. What are the tasks performed by operating system?

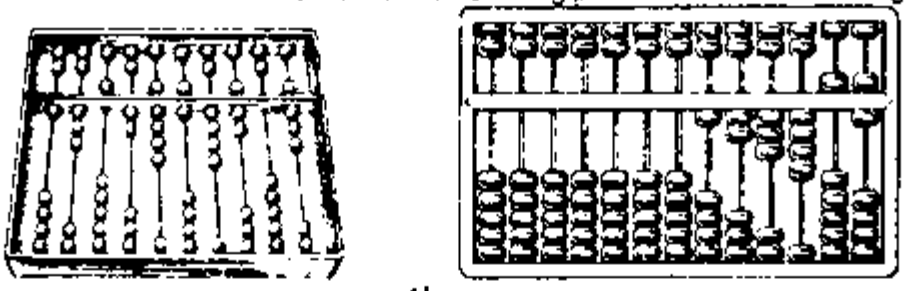
Ans: The following tasks are performed by the operating system.

i. It loads programs into memory and executes them.
ii. It controls the operation of input/output and storage devices.
iii. It manages files and folders.
iv. It allows to create password to protect computers from unauthorized use.
v. It detects hardware failures and displays messages to fix them.

xi. What are the tasks performed by Abacus?

Ans: Abacus: Abacus was the earliest calculating device most probably invented in China.

Construction: Abacus consisted of a wooden frame having parallel rods as shown in Fig.



Abacus

These rods had a number of wooden beads which could slide freely along the length of rods. While performing calculations, beads were moved up and down with fingers.

Tasks performed by Abacus:

Abacus was used to perform addition, subtraction, multiplication and division. It has been used in China and some other Asian countries till the end of 20th century.

xii. Differentiate between Difference Engine and Analytical Engine.

Ans: Difference Engine:

In 1822, the English mathematician Charles Babbage started working on a big calculating machine about the size of a room. He called it Difference Engine.

Analytical Engine:

Babbage worked for many years on Difference Engine but he could not complete it. Later, he came up with idea of Analytical Engine. He could not complete it because the technology was not advanced enough but he laid the foundation stone of modern digital computers.

Today's modern digital computers are based on the idea of analytical engine.

Father of modern digital computers:

Charles Babbage is known as the father of modern digital computers.

xiii. What are the various tasks performed by Mark-I ?

Ans. Mark-I:

Tasks performed by Mark-I: Mark-I could add three numbers having eight digits in one second. It could print out its results on punched cards or on an electric typewriter.
Size of Mark-I: Mark-I was 50 feet long, 8 feet high and weighed about 5 tons.
Technology used in Mark-I: It used 3,000 electric switches

SECTION – C

Note: Attempt any TWO questions. Each question carries equal marks. **(2 × 8 = 16)**

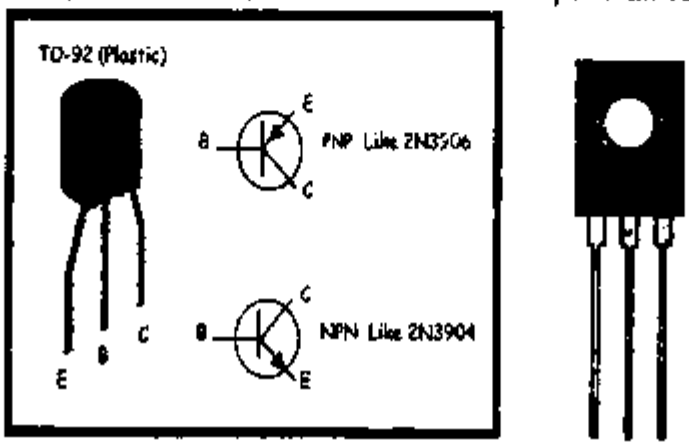
Q3. a. Write a short note on the second generation of computer and the technology used in it. Also write down the names of model used in second generation of computers?

Ans: Second Generation Computers (1956 – 1963):

In 1947, three scientists, William Shockley, John Bardeen and Walter Brattain invented transistor.

Transistor:

Transistor functions like a vacuum tube. It replaced the vacuum tubes in the second generation computers. Transistor was faster, more reliable, smaller and much cheaper than vacuum tube.



Transistor

Characteristics/Features of second generation computers:

The following are the characteristics of second generation computers.

i. Transistors were used instead of vacuum tubes.
ii. Transistors reduced the size of computers and increased the speed and memory capacity.
iii. Computers became more reliable and cheaper.
iv. Second generation computers used punch card readers, magnetic tapes, magnetic disks and printers.
v. Assembly language was used in these computers.
vi. High level programming languages, FORTRAN and COBOL were introduced in this generation of computers.

Models/examples:

Examples of second generation computers are UNIVAC II. IBM 7030, 7780 and 7090, NCR 300 series, General Electric GE 635 and Control Data Corporation's CDC 1604 computers.

b. Write a note on mainframe, minicomputer and microcomputer.

Ans: Mainframe Computer:

Mainframe computers were developed in early 1940s.

A mainframe computer is a very large, very powerful and expensive computer that can support hundreds and even thousands of users at the same time. Therefore, these computers are used in large organizations.

The modern mainframe computers that use cutting edge technology are the foundation of today's business in banking, insurance, education, air travel, research, health care, government and many other public and private organization. These computers can execute more than trillion instructions per second (TIPS). Some examples of mainframe computers are IBM's Enterprise EC12, EC 196, HP 16500 Series and HP Integrity Superdome.

Minicomputer:

Therefore, they can process more data than microcomputers. Today, minicomputers with cutting edge technology are playing an important role in business organizations for their data processing requirements. These are used in organizations that have hundreds of users such as PIA, NADRA, police departments, hospitals, etc. A minicomputer is shown in Fig Examples of minicomputers are IBM System/36 and HP 3000.

Microcomputer:

Microcomputers are the smallest and the low cost computers. These computers are most commonly used in homes and offices. Microcomputer was introduced in 1970s when microprocessor was developed. A microprocessor is a single chip that controls the operations of the entire computer system. Modern microcomputers have large storage capacity and they can execute millions of instructions per second (MIPS). A variety of software is available for use in these computers.

Microcomputers are available in various forms such as desktop, laptop and tablet as shown in Fig.

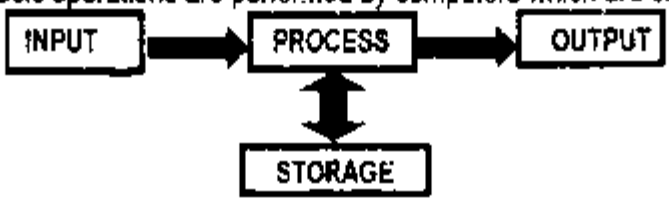
Microcomputer: (a)Desktop (b)Laptop (c)Tablet Microcomputer

Some popular companies that manufacture microcomputers are IBM, Dell, HP, Toshiba and Acer. A microcomputer is also known as Personal Computer or PC.IBM Lenovo series, Dell XPS series and HP Envy series are some popular microcomputers.

c. Explain the basic operations of a computer.

Ans: Basic Operations of a Computer:

The following four basic operations are performed by computers which are shown in Fig.



Basic operations of a computer

- Input operation
- Processing operation
- Storage operation
- Output operation

Input Operation:

A computer is a data processing machine. Users enter data and instructions into the computer through keyboard or mouse. it can also be provided to the computer from a storage device such as hard disk, CD or USB memory. The input data/instructions are stored in memory for further processing.

Processing Operation:

Microprocessor processes the data according to the instruction given to it. The microprocessor fetches the data/instructions from the memory and stores it in instruction register. The control unit then decodes the instruction to find out which operation is to be performed. After decoding the instruction, it sends signals to other parts of the computer to execute it

Storage Operation:

The results produced after processing are stored in memory before they are sent to the output device or permanent storage device like hard disk.

Output Operation:

The results of data processing stored in memory must be output so that they can be seen by the user. The control unit displays the results on the monitor or prints it on the printer. Results can also be saved in a storage device such as hard disk for use in the future.

Q4. Write short note on the following.

a. Hardware Engineer **b. Network Administrator**

c. Database Administrator **d. Web Designer**

Their work also involves repair and maintenance of computer hardware. They have in-depth knowledge of internal working of computers, processors, circuit boards and other electronic equipment.

b. Network Administrator:

Network administrators are responsible for installation, configuration and maintenance of computer networks in organizations. They are in charge of maintenance of computer hardware and software that make up a computer network. They assign passwords to network users so that unauthorized people do not have access to network.

c. Database Administrator:

Database administrator is a person who is responsible for the design, implementation and maintenance of a database in an organization. He is also responsible for maintaining security and monitoring the performance of database.

d. Web Designer:

Web designer is a person whose job is to plan and create websites. He designs web pages that include text, images, sound, video clips and make the website interactive. HTML (Hypertext Markup Language) is the most commonly used language for creating websites.

e. Multimedia Designer:

Multimedia designers are people who organize and present information in an easy to understand and attractive manner. They combine text, graphics, animation, audio and video. Multimedia designers create digital images and arrange them in sequence for animation using computer software. They have the skills to edit and manipulate audio/video files. They usually work in film/TV industry, computer software companies and advertising companies.

Q5. Describe the following types of application software.

a. Productivity software **b. Business software**
c. Entertainment software **d. Education software**

Ans: a. Productivity software:

Productivity software includes word-processing, spreadsheet and database management software packages These software packages are used by individuals to speed up their daily routine tasks by doing their work in an organized and efficient way

b. Business software:

Any software that helps in running business in a more efficient way to improve productivity is known as business software. Some examples of commonly used business software are accounting, sales and marketing, inventory control, project management and payroll software

c. Entertainment software:

Software developed to entertain people is known as entertainment software. Video games are one of the most popular forms of entertainment software Many games are lot of fun to play but sometimes they can also help to improve skills such as typing or reading. The term edutainment merges games and education software into single software. Edutainment software is used mainly for entertainment but it educates as well

d. Education software:

Software developed for educational purpose is known as education software. A large variety of education software has been developed. Education software includes typing tutor, spelling tutor, language learning, medical and healthcare, driving test and flight simulation software, etc.

IMPORTANT SHORT AND LONG QUESTIONS & ANSWERS

Q.1 Justify the statement that computer evolution is a continuous process.

Ans: Since computer evolution is a continuous process, it has not stopped in the modern era New systems are being developed to provide voice recognition and understand natural languages.

High performance computing (HPC):

High performance computing (HPC) is being used in today's data centers for fast data processing. High-performance computing (HPC) is the use of parallel processing for running advanced application

Cloud Computing:

The concept of "Cloud Computing" has been introduced. In the simplest terms, cloud computing means storing and accessing data and programs over the Internet instead of computer's hard drive.

Current advancements:

The current advancements in computer technology are likely to transform computer into intelligent machine having thinking power. The evolution of computers will probably continue till their processing capabilities have become equal to human intelligence or even beyond that.

Do You Know?

Intel invented the world's first microprocessor, the Intel 4004 in November, 1971.

Q.2 Write a short note on the fifth generation of computer and the technology used in it. Also write down the names of model used in fifth generation of computers?

OR

Write a note on Artificial Intelligence and fifth -generation of computers?

Ans: Fifth Generation Computers:

The goal of fifth generation of computers is to develop devices that can understand natural languages and have thinking power. This is a big challenge for computer developers and programmers to design such systems and software for them

Characteristics/features of fifth generation computers:

The following are the characteristics of fifth generation of computers.

i. Fifth generation computes are based on Artificial Intelligence (AI).
ii. In the fifth generation of computers, Artificial Intelligence (AI) will minimize the need to write programs.
iii. These computers will allow users to give commands in any natural language such as English.

Examples of fifth generation computers:

Examples of fifth generation computers are robots and expert systems.

For Your Information

Artificial Intelligence is the branch of computer science concerned with making computer behave like humans.

Q.3 List the TYPES/classification OF COMPUTERS.

Ans: Types of Computers:

On the basis of data representation, processing, Input and Output, Computers can be classified into the following three types.

i. Analog Computers ii. Digital Computers iii. Hybrid Computers

Q.4 List the classification of digital computers.

Ans: Classification of Digital Computers:

Digital computers are classified into mainframe, minicomputer and microcomputer based on their size, speed, storage capacity and the number of users they can support.

Q.5 List the use/Role of computers in education.

Ans: Education:

Role of computers in education has been given a lot of importance in the recent years. Computer technology eases the process of learning. Many programs are available for students to learn the subjects of Physics, Mathematics, Chemistry, Biology, etc.

Multimedia software makes the process of learning interactive and interesting. It combines text, graphics, sound and video for effective learning. Internet has enormous information on a wide variety of subjects.

Multimedia projectors:

important role in education. Today, computer education is a part of curricula from elementary to university level.

Q.6 List the Use/Role of Computers in Defence.

Ans: Use/Role of computers in defense:

There are various applications of computer technology in defense. Computers are used in tanks, planes and ships to target enemy forces. They help in tracking missiles and destroying them. Modern defense weapons and other equipment are controlled by computers.

Computers are used for designing and testing of weapons. Computers are also used in communication systems in defense.

Q.7 List the Use/Role of Computers in Media.

Ans: Use/Role of Computers in Media:

Computers have lot of applications in print and electronic media. Print media refers to mass communication through printed material.

Computer technology helps in preparation and production of newspapers, magazines, booklets and brochures, flyers, press releases and books.

Electronic media refers to broadcast media that includes radio broadcast, cable and satellite television broadcast and the new-age media like Internet and mobile devices. Computer is used for television broadcasting.

Q.8 Define Computer.

Ans: Computer:

A computer is an electronic data processing device. It reads data processing it and produces results accurately at a very high speed.

Q.9 Define Computer system.

Ans: Computer system:

A computer along with a number of units attached to it (such as keyboard, monitor, disk drives etc.) is known as a computer system.

Q.10 Write the names of three major units of computer system?

Ans: Major units of computer system:

Generally a computer system consists of the following three major units:

i. **System unit** ii. **Input units** (A keyboard, mouse etc.)

iii. **Output units** (A monitor, printer etc.)

Q.11 Write the names of hardware components of a computer system?

Ans: Hardware Components of Computer:

Hardware components of a computer system are classified into input devices, system unit, storage devices, output devices and memory.

Q.12 What is the function of input devices.

Ans. Input devices:

All the devices used to feed data into the computer are known as input devices.

Function of input devices:

Input devices allow us to communicate with the computer

Examples:

Some commonly used input devices are keyboard, mouse, microphone, scanner, barcode reader, digital camera and touch screen.

Q.13 Describe the division of keyboard and its functions?

Ans: Keyboard: It is the main input device to communicate with the computer.

Division of a Keyboard:

It allows the computer user to enter letters, numbers and special symbols into the computer.

Functions of a Keyboard:

A keyboard may be divided into four general areas:

Point To Ponder

Why the keys on keyboard are not arranged in alphabetical order?

Ans: In fact, the QWERTY layout was designed to let people type as quickly as possible without jamming a mechanical typewriter. As it happens, this same layout is nearly optimal for pure speed, as it tends to cause the fingers and hands to alternate.

OR (Second Answer)

The QWERTY keyboard layout was designed so that successive keystrokes would alternate sides of the keyboard so as to avoid jams in manual typewriters. Is frequently said that the design was also created to make people type slower.

First designs of manual typewriters using keyboards with letters on alphabetical order could not keep up with the speed of fast typist and the QWERTY keyboard layout was designed to reduce jamming.

Q.14 Describe the working and functions of mouse?

Ans: Mouse:

It is a hand-held device used to control the movement of cursor or pointer on the screen. It has two or three buttons at the front that allows the computer user to make selection in menu, draw graphics or open files, folders and programs. A mouse is shown is Fig.

Mouse

Q.15 Describe the working and functions of microphone?

Ans: Microphone:

It is a device that allows computer user to input audio into the computer.

It changes audio signals into electrical signals which are translated into digital form by the sound card for processing in the computer A microphone is shown in Fig.

Q.16 Describe the working and functions of scanner?

Ans: Scanner:

It is a device that captures images from photographs, magazines, books etc. and stores them in computer in digital form. These images can be edited, displayed on the screen or inserted in documents. A scanner is shown in Fig.

Scanner

Q.17 Describe the working and functions of barcode reader?

Ans: Barcode Reader:

It is a device that reads the barcode printed on products that represents product code, description and price. This information is used by the computer to print bill for the customer. A barcode reader is shown in Fig.

Barcode Reader

Q.18 Highlight the working and functions of digital camera.

Ans: Digital Camera:

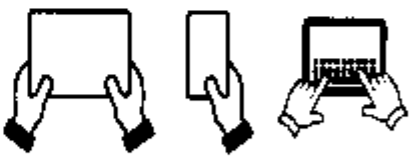
It is a device used to capture pictures and store them in digital form.

These pictures can be downloaded to computer for editing, viewing or inserting in documents. A digital camera is shown in Fig.

Q.19 Highlight the working and functions of touch screen.

Ans: Touch Screen:

It is a pressure-sensitive display screen that is used to interact with the computer by touching pictures or words with finger. Touch screen is more commonly used with mobile phone and tablet. A touch screen is shown in Fig.



Touch Screen

Q.20 Write the names of three major parts of SYSTEM UNIT ?

Ans: System Unit:

Q.21 Describe the working and structure of motherboard.

Ans. Motherboard:

Motherboard is the main circuit board inside the system unit It contains microprocessor, main memory, expansion cards, many IC chips, connectors and other electronic components.

It has many buses (electric pathways) printed on it. These are used to transmit information between various components of the computer. All the input/output devices are connected to the motherboard.

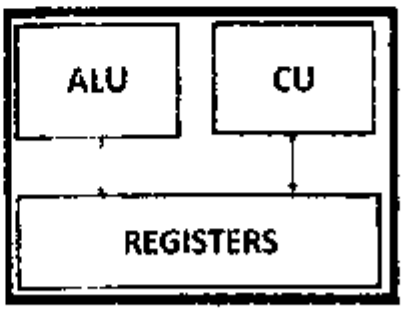
Q.22 Describe the working and structure of Microprocessor.

Ans: Microprocessor:

A microprocessor is the main chip on the motherboard that controls all the activities of the computer. It is also known as Central Processing Unit (CPU) or simply processor.

It contains Control Unit (CU), Arithmetic Logic Unit (ALU) and registers. A microprocessor and the block diagram of CPU are shown in Fig.

(a) Microprocessor



(b) Block diagram of microprocessor

ALU:

ALU is the part of the computer that performs all the calculations and comparisons. It consists of anthmetic unit and logic unit.

Arithmetic Unit:

Arithmetic unit performs all the arithmetic operations such as addition, subtraction, multiplication and division.

Logic Unit: Logic unit performs logical operations which include comparisons of numbers or alphabets.

Functions of Control Unit:

Control unit controls the operations of all the components of the computer. It controls the working of all the input/output devices, storage devices and ALU. CU loads programs into memory and executes them. It consists of very complicated circuits

Q.23 Briefly write about Registers.

Ans: Registers:

Registers are small memory units inside the microprocessor used to temporarily store some information during the execution of a program. Some commonly used registers are Instruction Register, Accumulator Register, Data Register and Memory Address Register.

Q.24 Briefly write about storage devices.

Ans: Storage Devices:

Storage devices are used to store programs and data that are not currently used by the computer. They have huge storage capacity. Therefore, they are also known as mass storage devices or secondary memory.

Hard disk is the most commonly used storage device that is fixed inside the system unit. Portable storage devices are CD, DVD, memory cards and USB flash drive.

Portable storage devices have less storage capacity than hard disk but they are cheap and easy to carry.

Q.25 Briefly write about hard disk.

Ans: Hard disk:

A hard disk is a magnetic storage device used to store computer data. It has storage capacity of hundreds of Gigabyte (GB). It is fixed inside the computer casing. Portable hard disk is also available that is

It is a portable optical storage device with a storage capacity of 700 Megabytes (MB). A CD is 1.2 millimeter thick with a diameter if 120 millimeters. CD drive is used to read data from or write data to a CD.

Q.27 Briefly write about DVD/Digital Versatile Disk.

Ans: DVD/ Digital Versatile Disk:

DVD stands for Digital Versatile Disk. It has the same thickness and diameter as CD but has more storage capacity. Its storage capacity is in the range of 4 to 16 GB. A DVD writer is installed in the computer to read data from or write data to a DVD. A CD can also be used in a DVD writer.

Q.28 Briefly write about Memory Card.

Ans: Memory Card:

Memory card is a small storage device having storage capacity of few Gigabytes. It is available in different sizes and storage capacities.

Memory cards are generally used in laptop computers and portable devices such as mobile phone and digital camera for storing pictures, audio and video. A memory card is shown in Fig.

Q.29 Briefly write about USB flash drive.

Ans: USB Flash Drive/USB memory:

USB flash drive is a small portable drive that is connected to computer through USB port. It is also known as USB memory. It is very fast in operation and its storage capacity is up to 128 GB till now. A USB flash drive is shown in Fig.

Q.30 Write about the significance of output devices.

Ans: Output Devices:

Output devices are used to display text, graphics and images on the monitor or to print information on paper.

Softcopy and hardcopy/printout:

Information displayed on monitor is known as softcopy and anything printed on paper is known as hardcopy or printout.

Commonly used output devices are monitor, printer, plotter and speaker.

Q.31 Describe some features of different types of monitors.

Ans: Monitor: It is an output device that has a screen on which information is displayed.

Types of Monitor:

It has two common types i.e. CRT (Cathode Ray Tube) monitor and LCD (Liquid Crystal Display) monitor.

CRT monitor:

CRT monitor is very similar to old television. It is almost obsolete due to its big size and low display quality.

LCD monitor:

LCD monitor is slim, uses less power and has better display quality than CRT monitor. CRT and LCD monitors are shown in Fig.

Q.32 What is printer. Write name of different types of printers.

Ans: Printer: Printer is an output device that prints text and graphics on paper which is known as hardcopy.

Types printers: There are two types of printers which are impact and non-impact printers.

For Your Information

The first high-speed printer was developed in 1953 by Remington Rand (an early American business machines manufacturer) for use on UNIVAC computer.

Q.33 What is an impact printer? How does it work? Describe the different features of Dot matrix printer.

Ans: Impact Printer:

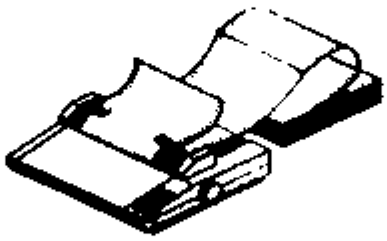
Features of Dot matrix printer:

Dot matrix printer is the most commonly used impact printer. The printing speed varies from 50 to 500 cps (characters per second).

Their printing is very cheap but print quality is poor. They produce lot of noise while printing.

Uses of Dot matrix printer:

These printers are still in use for printing invoices, bank statements, utility bills, etc. A Dot matrix printer is shown in Fig.



Dot Matrix Printer

Q.34 What is a non- impact printer? How does it work? Describe the different features of non-impact printer.

Ans: Non-Impact printer:

Non-Impact printer prints without striking the paper.

Types of non-Impact printers:

There are two types of non-Impact printers which are inkjet and laser printers.

Inkjet and laser printers:

Inkjet printer stores ink in cartridge and sprays on paper through fine nozzles on the print-head.

Inkjet and laser printers:

Laser printer uses technology similar to photocopying machine. Laser printer is more expensive, faster and has very high print quality compared to inkjet printer.

Inkjet printers are used in all sectors such as homes and simple businesses. Laser printers are perfect for large scale businesses. Inkjet and laser printers are shown in Fig (a, b).

(a) Inkjet Printer

(b) Laser Printer

Q.35 What is a plotter? How does it work? Describe the different types of plotters.

Ans: Plotter:

Plotter is an output device used for printing engineering drawings, machine parts, building designs, maps, charts and panaflexes etc. on large size papers/sheets.

Such large size printing is not possible on printers. It is more expensive than printer.

Types of plotters:

There are two types of plotters, that is, ink plotter and pen plotter.

Uses of plotters:

Ink plotter is used for printing images whereas pen plotter is used for printing engineering drawings, machine parts, building designs, etc. Plotter is a slow output device but its printing quality is good.

Q.36 Describe some features of Speaker.

Ans: Speaker:

Speaker is a device used to produce audio output. A pair of speakers is attached to the sound card on the motherboard.

Speakers are commonly used with multimedia software and for playing music and videos on computer.

Q.37 List some functions of memory.

Ans: Memory:

Memory unit stores data and programs that are being executed by the computer. It also stores the results produced by the ALU after processing the data.

Types of memories:

There are three types of memories on the motherboard which are ROM (Read Only Memory), RAM (Random Access Memory) and Cache.

These are known as main memory or primary memory of computer.

Q.38 What is ROM? How do PROM and EPROM differ from each other?

Ans: ROM (Read Only Memory):

ROM is a single IC chip which is installed on the motherboard.

Types of memories:

It stores the Basic Input/output System (BIOS) of computer that controls input/output devices and the start-up or boot process.

BIOS programs:

BIOS programs test the computer's components when it is turned on and then load the operating system into the RAM to make the computer ready for operation

BIOS programs are permanently stored in ROM when it is manufactured.

ROM is non-volatile memory:

ROM is non-volatile memory, that is, the programs stored in it are not lost when the computer is turned off.

Types of ROM: There are three common types of ROM which are:

i. **PROM** (Programmable ROM)
ii. **EPROM** (Erasable Programmable ROM)
iii. **EEPROM** (Electronically Erasable Programmable ROM).

ROM Chip

Difference between PROM and EPROM:

PROM (Programmable Read Only Memory)	EPROM (Erasable and programmable Read Only Memory)
i. PROM is a non-permanent memory of a computer. It is programmable read only memory.	**i.** EPROM is a non-permanent memory of a computer. It is programmable and erase able read only memory.
ii. PROM is the Programmable ROM that allows the user to store data an instrument called a PROM programmer does the storing by 'burning in', once the data has been burned, the data cannot be erased.	**ii.** EPROM (Electronic Programmable Read Only Memory) chips can be erased if it needs to be updated or fixed. It can be erased electronically only These are comparatively expensive than PROMs.
iii. PROM (Programmable Read Only Memory) chips are relatively once written and to rewrite	**iii.** On the other hand, an EPROM allows the data to be erased by the help of uv (Ultra violet) lights. i.e.

Q.39 What do you know about RAM?

Ans: Random Access Memory (RAM):

RAM is high speed memory installed on the motherboard It is READ/WRITE memory. Information can be read from or written into it. Programs are loaded into RAM from secondary storage devices such as hard disk or USB flash drive for execution by the microprocessor

Volatile memory:

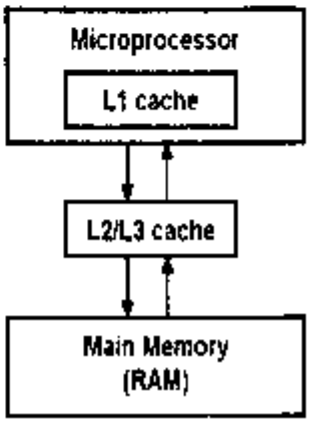
RAM is volatile memory which means information stored in it, is lost when the computer is turned off. RAM modules are installed in the memory slots on the motherboard. RAM modules are shown in Fig.

RAM Modules

Q.40 Describe various features of Cache Memory?

Ans: Cache Memory:

Cache is a very small amount of extremely fast memory inside the microprocessor or on the motherboard.
It is faster and more expensive than RAM.



L1, L2 and L3 Cache Memories

Function of cache:

Cache Memory stores information that is most frequently used by the computer.

Purpose of using cache:

The purpose of using cache is to improve the processing speed of computer.

Types of cache memories:

There are three types of cache memories which are:

Level 1(L1), Level 2(L2) and Level 3(L3) as shown in Fig.

Location of Level 1(L1), Level 2(L2) and Level 3(L3):

L1 cache is built inside the microprocessor whereas L2 and L3 are on the motherboard.

Note: L1 cache is faster than L2 and L3 cache.

Q.41 Describe the function of ports in a computer. How many types of ports are generally present in a computer system?

Ans. Ports:

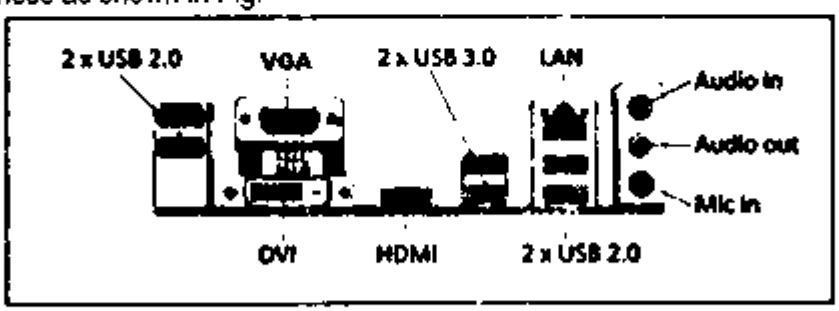
Port is an interface for connecting various devices to the system unit These are located on the motherboard and are usually seen at the back of the system unit

Function of Port:

A port provides a direct link for external peripheral devices such as keyboard, mouse, monitor, printer etc via cables with the computer's common electrical bus.

Types of ports:

There are various types of ports for connecting keyboard, mouse, monitor, microphone, speakers and other input/output devices as shown in Fig.



Ports on motherboard

are used for connecting various devices to the computer. These devices include digital camera, scanner, printer, external hard disk or DVD writer and USB memory, etc.

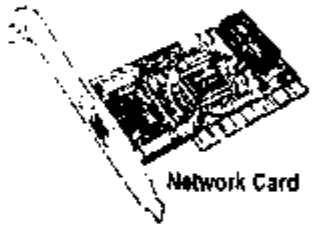
Q.42 Describe the function of expansion slots and expansion cards in a computer.

Ans: Expansion Slots:

Expansion slots are long narrow sockets on the motherboard used for installing expansion cards.

Expansion Cards:

Expansion cards are small circuit boards. These cards add new capabilities to the computers.


Network Card

Commonly used expansion cards are sound card, graphics card, modem card and network card. In modern computers these cards are built-in on the motherboard. A network card is shown in Fig.

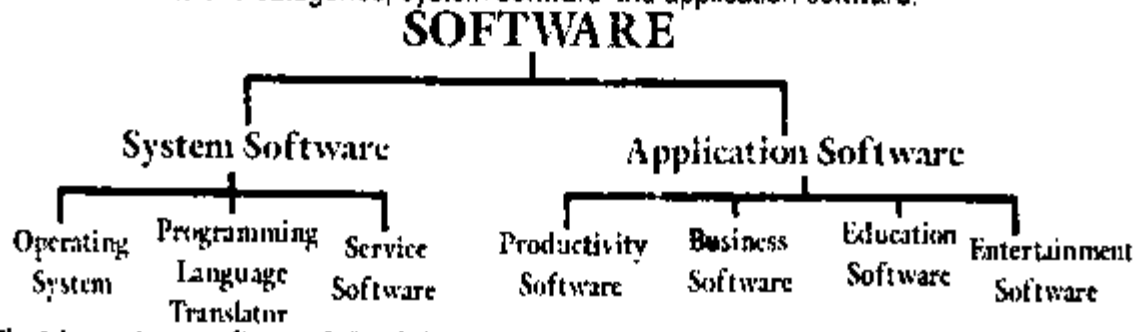
Q.43 What is computer software? List the main groups of computer software?

Ans. Computer Software:

Computer programs are known as computer software. Computer program is a set of instructions that tells a computer what to do and how to do.

Types computer Software:

It is classified into two categories, system software and application software.



Q.44 What is system software? Explain the four main groups of system software?

Ans. System Software:

System software is a collection of programs which makes the use of computer easy and efficient. Highly experienced computer programmers develop system software

Main groups of system software:

Following are the types of system software.

- Operating system
- Utility programs
- Device drivers
- Language processors

i. Operating System:

An operating system is system software that is responsible for the management and coordination of all the activities performed by the computer.

It provides the environment in which the user can interact with the computer hardware to operate the computer

The most popular operating system used in microcomputers is the Windows.

Tasks performed by the operating system:

The following tasks are performed by the operating system.

i. It loads programs into memory and executes them.
ii. It controls the operation of input/output and storage devices.
iii. It manages files and folders.
iv. It allows to create password to protect computers from unauthorized use.
v. It detects hardware failures and displays messages to fix them.

ii. Device Drivers:

A device driver is system software that controls the operation of a computer device.

When users attach a device such as printer or scanner to their computer, they should install its driver

Commonly used utility programs:

The following are some commonly used utility programs that perform specific tasks.

Windows Explorer:	It is used to manage files and folders
Backup utility:	It is used to make backup of data
WinZip utility:	It is used to compress files.
Diagnostic utility:	It is used to detect hardware and software problems.
Antivirus software:	It is used to detect and remove viruses.

iv. Language Processors:

A language processor is a system program used to translate computer programs into machine language.

Machine language is directly understood by the computer. Therefore, all the programs must be translated into machine language before execution by the computer

Compiler and interpreter:

Compiler and interpreter are language processors used to translate high level language programs into machine language.

Assembler:

A program called assembler is used to translate assembly language programs into machine language

Q.45 What is application software? List the main groups of computer software?

Ans. Application Software:

Application software is developed for computer users to solve their problems such as preparing a letter creating a presentation or managing a database.

Main groups of application software:

Commonly used application software includes productivity software, business software, entertainment software and education software

Q.46 Elaborate open source software, shareware and freeware.

Ans. i. Open Source Software:

It is computer software that is available in the form of source code that allows users to study, change and improve it Open source software is free for use, modification and distribution.

Examples of open source software:

Some examples of open source software are Linux operating system, Open Office (office productivity software), Flight Gear (flight simulator) and Java programming language, etc

ii. Shareware:

Shareware is distributed free of cost for a limited period usually one or two months. It is trial version of software given to people to decide whether they would like to buy the full version of the software.

Some shareware is installed on new computers when they are sold

Examples of shareware:

Examples of shareware are antivirus software and computer games. etc.

ii. Freeware:

Freewafe is given free of cost and it is full version of software for an unlimited period of time. It may have some restrictions such as allowed for personal or academic use only.

Examples of freeware:

Examples of freeware are Google Chrome, Mozilla Firefox VLC media player, etc.

GUESS PAPER & MODEL PAPER # 2

Based on Chapter # 02 (Reduced Syllabus)
FUNDAMENTALS OF OPERATING SYSTEM

SECTION – A (Marks 12)

Time allowed: 20 Minutes **Total marks: 12**

NOTE: Section-A is compulsory. All parts of this section are to be answered on the question paper itself. It should be completed in the first 20 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q.1 Circle the correct option i.e. A / B / C/ D. Each part carries one mark.

i. Which interface is based on textual input?

A. GUI B. CLI
C. Menu-driven interface D. Windows

ii. Which of the following interface uses window, icon, menu and pointer to interact with computer?

A. GUI B CLI
C. Menu-driven interface D. DOS

iii. Which of the following operating system was introduced in 1969?

A. Macintosh B Linux
C. Unix D. Windows

iv. Which of the following operating system must process information and produce a response within a specified time?

A. Batch Processing System B Time-sharing System
C. Multiprogramming System D. Real-time System

v. Which of the following is open source operating system?

A. UNIX B. Linux
C. DOS D. Novell's Netware

vi. Which of the following user interface is the easiest one to learn and use?

A. CLI B GUI
C Menu driven interface D. DOS

vii. Which of the following operating system allows many users to use a computer at the same time?

A. Single-user operating system B. Batch processing system
C. Real-time processing system D. Multi-user operating system

viii. In which of the following operating system, CPU is switched rapidly between all the programs to simultaneously execute all of them?

A. Batch Processing System B. Time-sharing System
C. Real-time System D. DOS

ix. Which of the following Windows icon allows user to access a program, file or folder quickly?

A. Program icon B. Computer icon
C. Shortcut icon D. Recycle Bin icon

x. Which of the following Windows icon allows user to access the contents of computer drives and manage files and folders?

xi. DOS stands for.
A. Dual Operating System B. Disk Operating system
C. Division Operating System D. None of these

xii. Windows 10 comes with Windows Defender which is.
A. Anti-virus software B. Presentation software
C. Computer-aided design (CAD) software D. Multimedia software

COMPUTER SCIENCE (SSC-I)

Time allowed: 2:40 Hours Total Marks section B & C = 43

Note: Answer any nine parts form Section 'B' and attempt any two questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet-B if required. Write your answers neatly and legibly.

SECTION – B (Marks-27)

Q.2 Attempt any NINE parts. The answer to each part should not exceed 3 to 4 lines each. (9 × 3 = 27)

i. Why operating system is important software for a computer? Give any five reasons.
ii. Give any three objectives of operating system?
iii. Mention few disadvantages of using DOS.
iv. Name two operating systems which are used in modern mobile phones.
v. What difficulties a student may face if he/she is not familiar with the operating system of a computer?
vi. Define UNIX and Windows operating system.
vii. Differentiate between single-user and multi-user operating systems.
viii. What is meant by resources of computer?
ix. What is an operating system?
x. List common types of operating systems?
xi. What is Disk Operating System (DOS)?
xii. List the classification of operating system.
xiii. List the types of operating system.

SECTION – C (Marks-16)

Note: Attempt any TWO questions. Each question carries equal marks. (2 × 8 = 16)

Q3. a. Explain the main functions of operating system.
b. Write notes on Macintosh and Linux operating systems.

Q4. Describe the following computer interfaces.
a. Command Line Interface b. Graphical User Interface
c. Menu-driven Interface

Q5. Describe the following types of operating systems.
a. Batch Processing System b. Time-sharing System
c. Real-time System

SOLUTION OF GUESS PAPER & MODEL PAPER # 2 (Reduced Syllabus)

SECTION – A (MCQs)

SECTION – B

Q.2 Attempt any NINE parts. The answer to each part should not exceed 3 to 4 lines each. **(9 × 3 = 27)**

i. Why operating system is important software for a computer? Give any five reasons.

Ans: Functions of operating system:

The following are the main functions of operating system.

- Process Management
- Memory Management
- Input/Output Management
- File Management
- Resource Management
- User Management

Due to these reasons operating system is important software for a computer

ii. Give any three objectives of operating system?

Ans: Objectives of operating system (OS):

The main objectives of the operating system are convenience and efficiency. It makes the computer more convenient to use. It allows computer resources such as CPU, memory, input/output devices and Internet to be used in an efficient manner. It can be viewed as a resource manager.

iii. Mention few disadvantages of using DOS.

Ans: User must know the syntax of the command. DOS commands are difficult to remember. It is a single user and single task operating system

Its character base interface therefore cannot support graphics Its cannot use easily as Graphics user interface.

iv. Name two operating systems which are used in modern mobile phones.

Ans: Popular Mobile Operating Systems:

- Android OS (Google Inc.)
- Bada (Samsung Electronics)
- BlackBerry OS (Research In Motion)
- iPhone OS / iOS (Apple)
- MeeGo OS (Nokia and Intel)
- Palm OS (Garnet OS)
- Symbian OS (Nokia)
- webOS (Palm/HP)

v. What difficulties a student may face if he/she is not familiar with the operating system of a computer?

Ans: Computer user must know how to give commands to the computer to operate it properly.

Computer user must know basic knowledge about operating system It teaches the user how to use the operating system to run programs and manage files and folders

Without basic knowledge about operating system, a computer is useless

Student may face difficulties of the steps involved in installation of operating system, office automation software and antivirus software in computer

Therefore a student must familiar with the operating system of a computer

vi. Define UNIX and Windows operating system.

Ans: UNIX:

UNIX Operating System:

UNIX is a multi-user CLI operating system introduced in 1969 It allows multiple users to run different programs at the same time. UNIX was developed for use on large computer system (Mainframe). It uses a command line interface but later Graphical User Interface was also introduced.

Some of these versions are Windows 95, Windows 98. Windows Millennium, Windows XP, Windows Vista, Windows 7, 8 and 10.

vii. Differentiate between single-user and multi-user operating systems.

Ans: Difference between single-user and multi-user operating systems:

Single-user Operating System:

Operating system that is used by a single user at a time is known as single-user operating system.

- It allows a single user to login and use the computer at a time. It is easy to use
- Resources of the computer, such as CPU, memory and input/output devices are not shared with other computers.
- It is used on microcomputers.
- User can open many programs at the same time and switch among them as required.
- It requires less memory and costs less.
- Some examples of single-user operating systems are DOS. Windows 95, Windows XP, Windows 7, etc.

Multi-user Operating System:

Operating system that allows many users to use a computer at the same time is known is multi-user operating system.

- It allows many users to login to a single big computer and run different programs at the same time.
- It shares the resources of the computer with other users over the network.
- It is used on minicomputers and mainframes.
- Users can communicate with each other and share files
- A person known as administrator is responsible for assigning and managing user names and passwords.
- It requires a powerful CPU, large memory and large hard drives.
- It supports multiprogramming and time-sharing.
- Windows NT, UNIX and Linux are popular multi-user operating systems.

viii. What is meant by resources of computer?

Ans: Resource of computer:

Operating system automatically manages the resources of a computer when application programs are executed by computer user

The resources of a computer include microprocessor, memory and all the devices attached to the computer. Operating system allocates resources of a computer to the application program according to the user's requirement in an efficient way to improve the performance of the computer.

ix. What is an operating system?

Ans: Operating System:

Operating system is a collection of system software that controls the working of computer system. It acts as an interface between the computer user and computer it facilitates program execution and helps in developing application programs.

x. List common types of operating systems?

Ans: Common Types of Operating Systems:

There are three types of operating systems based on ways of interaction with computer (interface). The three types of interfaces are:

- Command Line Interface.
- Menu Driven Interface.
- Graphical User Interface (GUI).

xi. What is Disk Operating System (DOS)?

Ans: Disk Operating System (DOS):

DOS was the most popular CLI operating system. DOS displays the prompt (C:\>) to enter commands. User must know the syntax of the command DOS commands are difficult to remember. Some DOS commands are still supported by the new Windows operating system. It is a single user and single task operating system.

Examples of DOS commands:

The following are some examples of DOS commands with their description DIR Display the contents of

CD\PICS: CD stands for Change Directory, which makes PICS the current directory.

xii. List the classification of operating system.

Ans: Classification of Operating System:

Operating systems can be classified into two major categories single-user and multi -user operating systems.

xiii. List the types of operating system.

Ans: Types of Operating Systems:

There are three types of operating systems. These are batch processing, Time-sharing and real-time operating systems

SECTION – C

Note: Attempt any TWO questions. Each question carries equal marks. **(2 × 8 = 16)**

Q3. a. Explain the main functions of operating system.

Ans: Main Functions of Operating System:

The following are the main functions of operating system

- Process Management
- Input/output Management
- Resource Management
- Memory Management
- File Management
- User Management

Process Management:

Process management is an essential part of operating system (OS) A process is a program in execution. In computer system multiple processes are executing concurrentiy or waiting for their turn to be executed. A process in execution needs resources like processing resource, memory and I/O resources The OS must allocate resources to processes, enable processes to share and exchange information, and protect the resources of each process from other processes.

Memory Management:

Memory management is the process of allocating memory space for user programs in main memory. When programs are run by users, the operating system allocates portions of free memory to programs When a program is closed, operating system will free the memory portion used by that program for reuse The operating system automatically loads user programs in available memory space and executes them.

Input/output Management:

Input/output management is the process of controlling the operation of all the input/output devices attached to computer. User communicates with computer through various input/output devices such as keyboard, mouse, monitor printer, etc. Management of these devices is the responsibility of operating system. Operating system uses Input/output controller to manage and coordinate the operation of all the input/output devices

File Management:

File management system is part of operating system that organizes stores and keeps track of computer files and folders. Computer files can be documents, programs images, videos, etc Operating system controls the common operations performed on files. These operations include creating, opening, editing, renaming moving, copying, deleting and searching files

Resource Management:

Operating system automatically manages the resources of a computer when application programs are executed by computer user. The resources of a computer include microprocessor, memory and all the devices attached to the computer. Operating system allocates resources of a computer to the application program according to the user's requirement in an efficient way to improve the performance of the computer.

User Management:

User management is an important feature of operating system for maintaining a secure computer system. The operating system gives full control over a computer system to a person known as administrator. Administrator installs various programs on the computer system for users. He also creates and manages user accounts. When a user account is created, the user is assigned a user name and a

A user can login to the computer system by entering the user name and password, run programs and save his files in his personal folder. Operating system does not allow the users to install programs or create new users

b. Write notes on Macintosh and Linux operating systems.

Ans: Macintosh Operating System:

Mac OS is a series of operating systems developed by Apple Incorporation for their Macintosh computers. It was introduced in 1984 with the original Macintosh computer and has GUI.

The latest version is Mac OS X. It is a UNIX based user-friendly operating system. There are some specialized versions of Mac OS X used on devices such as iPhone iPod, iPad and new Apple TV.

Linux Operating System:

Linux is free open-source operating system introduced by Linus Torvalds in 1991. It is faster but difficult to use as compared to Macintosh and Windows operating systems. It is not a popular operating system

Linus Torvalds started the development of Linux operating system and laid its foundation. Millions of programmers around the world work on Linux to improve it.

Its source code is freely available on Internet. Programmers can view, edit and publish an improved version.

Linux OS can be installed on PCs, laptops, netbooks, mobile and tablet devices, video game consoles, servers, supercomputers and more. The Linux OS is frequently packaged as a Linux distribution for both desktop and server use, and includes the Linux kernel (the core of the operating system) as well as supporting tools and libraries.

Popular Linux OS distributions include Debian, Ubuntu, Fedora, Red Hat and openSUSE.

Q4. Describe the following computer interfaces.

a. Command Line Interface **b. Graphical User Interface**

c. Menu-driven Interface

Ans: a. Command Line Interface:

In CLI, commands are given to computer with keyboard. It is based on textual input. The user types in a command and presses the Enter key to execute it. Two commonly used operating systems that use CLI are DOS (Disk Operating System) and UNIX. CLI is difficult to use because users have to remember the commands to perform any task.

b. Graphical User Interface:

GUI is a graphical interface for computer users to interact with computer. It uses windows, icons, menus and pointer. Window is a rectangular portion of monitor in which information is displayed. Icon is a graphical symbol that represents a file, folder, program, device, etc. To perform a task, the user has to select icons or make choices in menus using a pointing device such as mouse

The following are the advantages of GUI.

i. Much easier to learn and use
ii. No need to memorize the commands
iii. Allows users to run more than one program at the same time
iv. Most of the GUIs provide good help facilities
v. Many application programs also use a similar interface so it is easy to use a new program

The following are the disadvantages of GUI.

i. Takes up lot of memory.
ii. Needs faster computer as compared to other interfaces

Examples of operating systems that use GUI are Macintosh, Linux and Windows.

c. Menu-driven Interface:

Menu driven interface presents a menu on the screen. User makes a choice and then the next menu appears. The user makes another choice and so on. Menu driven interface is easy to use as compared to CLI. The user reads the options and makes his choices. Menus contain the commands to use the operating system.

- **Novell's Netware:**
  Novell's Netware was a menu-driven operating system that was used in the past. Its first version was released in 1993.
- **ProDOS:**
  ProDOS was another menu-driven operating system that was used on some Apple computers

Q5. Describe the following types of operating systems.

a. Batch Processing System **b. Time-sharing System**

c. Real-time System

Ans: a. Batch Processing System:

In a batch processing system, jobs are grouped in batches and the computer executes them one by one. When the current job terminates, the computer automatically loads the next job and starts executing it. Batch processing operating systems greatly improved the use of computer system

Batch processing systems are suitable for tasks where large amount of data has to be collected and processed on a regular basis.

For example, in credit card billing systems, all the data of credit card holders is collected and held until processed as a batch at the end of billing cycle. As another example, in examination report card system, all the data of student's examinations is collected and processed as a batch for printing report cards.

b. Time-sharing System:

Timesharing system is a feature of operating system in which multiple users can run different programs on a large-scale computer. It allows many users to have access to a computer at the same time and share the computer's time In a timesharing system, the central processing unit is switched rapidly between the programs so that all the user programs are executed simultaneously

The operating systems used in minicomputers and mainframe computers support timesharing. Timesharing operating systems are used in organizations such as airline, bank, hotel, university, etc. where many users need access to the central computer at the same time.

For example, hundreds of students access the university's mainframe computer at the same time and they run different programs in a timesharing system in interactive mode.

c. Real-time System:

Real time operating systems must process information and produce a response within a specified time. These operating systems are developed for special applications.

These are used to control industrial processes such as oil refining. Real time operating systems are used to supply immediate response within limited time. For example, a measurement from an oil refinery indicating that temperatures are getting too high might demand quick response to avert an explosion.

There are a number of real-time operating systems used in military and space research programs.

For example, real-time operating system is used to monitor the position of rocket in the space. Many cities are installing real-time traffic control systems to facilitate smooth flow of traffic at busy intersections.

IMPORTANT SHORT AND LONG QUESTIONS & ANSWERS

Do You Know?

Microsoft introduced the MS DOS in 1981 and it was replaced by Windows 3.0 in 1990.

GUESS PAPER & MODEL PAPER # 3

Based on Chapter # 04 (Reduced Syllabus)

DATA COMMUNICATION

SECTION – A (Marks 12)

Time allowed: 20 Minutes **Total marks: 12**

NOTE: Section-A is compulsory. All parts of this section are to be answered on the question paper itself. It should be completed in the first 20 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q.1 Circle the correct option i.e. A / B / C/ D. Each part carries one mark.

i. In which type of data transmission start/stop bits are used?

A Synchronous transmission B Asynchronous transmission
C. Satellite transmission D. Microwave transmission

ii. In which of the following transmission, the time interval between the characters is always the same?

A. Synchronous transmission B. Asynchronous transmission
C. Satellite transmission D Microwave transmission

iii. Which of the following transmission media uses light waves for transmitting information?

A. Coaxial cable B Twisted pair cable
C. Telephone line D. Fibre optic cable

iv. Which of the following is used for short distance communication?

A. Radio signals B Microwave
C. Infra-red D. Satellite communication

v. In which of the following impairment, the strength of signal falls off with distance?

A. Distortion B Attenuation C Cross talk D. Noise

vi. Which of the following impairment refers to undesired signals that enter the path of the transmitted signal due to electromagnetic radiation?

A. Distortion B Attenuation C Cross talk D. Noise

vii. Which of the following device is used for connecting computers together in wireless local area network?

A. Dial-up modem B. Router C Switch D Access point

viii. Which of the following device is used for connecting computers together in wired local area network?

A. Dial-up modem B Router C. Switch D Access point

ix. Which of the following device forwards information from one network to another by selecting the best pathway available?

A Dial-up modem B. Router C Switch D. Access point

x. What represents the overall data transmission capacity of a computer network?

A. Data rate B. Bandwidth C. Signal strength D. Baud rate

xi. Data communications are transfer of data through some

A. transmission medium B. linear medium
C. Network LAN D. Protocols

xii. Protocols are set of rules to govern

COMPUTER SCIENCE (SSC-I)

Time allowed: 2:40 Hours | Total Marks section B & C = 43

Note: Answer any nine parts form Section 'B' and attempt any two questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet-B if required. Write your answers neatly and legibly.

SECTION – B (Marks-27)

Q.2 Attempt any NINE parts. The answer to each part should not exceed 3 to 4 lines each. (9 × 3 = 27)

i. Differentiate between analog and digital signals.
ii. Why digital signals are used in computer systems?
iii. Name the properties of a good communication system.
iv. Give any three reasons why guided communication medium is more reliable than unguided medium.
v. What is meant by transmission impairment?
vi. Differentiate between attenuation and distortion.
vii. What is cross talk?
viii. What is Dial-up modem? Why is it used?
ix. Define data rate and baud rate.
x. Define bandwidth.
xi. Describe the different types of transmission media.
xii. Why do satellites stay in orbit and never fall on the earth?
xiii. Describe Signal-to-Noise Ratio.

SECTION – C (Marks-16)

Note: Attempt any TWO questions. Each question carries equal marks. (2 × 8 = 16)

Q3. a. Describe the components of communication system with the help of diagram.
b. Explain asynchronous and synchronous transmission modes with examples.
c. List the data transmission terminologies.

Q4. a. Describe the following guided media.
i. Twisted pair cable ii. Coaxial cable iii. Fiber optic cable
b. Describe any three types of unguided media.

Q5. a. Describe the functions of the following communication devices.
i. Router ii. Network Interface Card (NIC)
iii. Switch/Access point
b. Use appropriate formulae to determine the characteristics of a communication channel.

SOLUTION OF GUESS PAPER & MODEL PAPER # 3 (Reduced Syllabus)

SECTION – A (MCQs)

i. B	ii. A	iii. D	iv. C	v. B	vi. C
vii. D	viii. C	ix. B	x. B	xi. A	xii. A

SECTION – B

Q.2 Attempt any NINE parts. The answer to each part should not exceed 3 to 4 lines each. **(9 × 3 = 27)**

i. Differentiate between analcg and digital signals.

Ans: Difference between analog and digital signals:

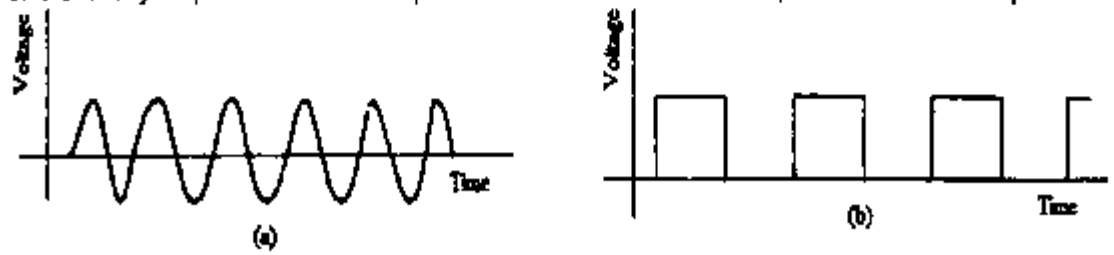
Analog signals:

Analog signal is in continuous form. It varies continuously within a range as shown in Fig (a).

For example, sound is an analog signal. Analog transmission uses signals that are exactly the same as sound waves.

Digital signals:

Digital signals are not continuous They switch between two discrete, low and high voltage levels as shown in Fig (b). In digital computers, low voltage level represents binary 0 and high voltage level represents binary 1. Information represented in digital form can be easily transmitted by series of "ON" and "OFF" signals by pulses of electricity. A pulse "ON" can represent 1 and the absence of pulse "OFF" can represent 0.



(a) Analog and (b) Digital Signals

OR (Second Answer)

Difference between analog and digital signals:

	Analog signal	Digital signal
Basic	An analog signal is a continuous wave that changes over a time period.	A digital signal is a discrete wave that carries information in binary form.
Representation	An analog signal is represented by a sine wave.	A digital signal is represented by square waves.
Description	An analog signal is described by the amplitude, period or frequency, and phase.	A digital signal is described by bit rate and bit intervals.
Range	Analog signal has no fixed range.	Digital signal has a finite range i.e. between 0 and 1.
Distortion	An analog signal is more prone to distortion.	A digital signal is less prone to distortion.
Transmit	An analog signal transmit data in the form of a wave.	A digital signal carries data in the binary form i.e. 0 and 1.
Example	The human voice is the best example of an analog signal.	Signals used for transmission in a computer are the digital signal.

ii. Why digital signals are used in computer systems?

Ans: Information represented in digital form can be easily transmitted by series of "ON" and "OFF" signals by pulses of electricity. A pulse "ON" can represent 1 and the absence of pulse "OFF" can represent 0.

Multiple bit (0,1) streams are used in a computer network Digital data can be compressed relatively easily. thereby increasing the efficiency of transmission.

That is why digital signals are used in computer systems

iii. Name the properties of a good communication system.

Ans: Characteristics of a Good Communication System:

Following are the properties of a good communication system.

For example, when e-mail is sent to a person, it is received only by the person to whom it is addressed. This is managed by the protocol used in the data communication system

Accuracy:

System must deliver the message accurately without any change. If incorrect data is transmitted by the system, it may not be usable by the receiver.

For example, when data is transmitted over a long distance, it may get corrupted due to transmission errors. The data that is not correctly received at the destination is retransmitted from the source. This is ensured by the protocol used in the data communication system.

Timeliness:

The system must deliver the data without significant delay in a timely manner. It is very important in real time transmission such as video conferencing that video and audio are delivered as soon as they are produced Data delivered late may be useless.

Some real time systems require immediate transmission of data within limited time.

For example, a computerized real time system is used to monitor the temperature in an oil refinery If the temperature is getting too high, it must be transmitted immediately otherwise there can be an explosion

iv. Give any three reasons why guided communication medium is more reliable than unguided medium.

Ans: The purpose of Guided media is to reduce cross talk and electromagnetic interference and make the transmission more reliable.

It provides high quality transmission at extremely fast speed. It can transmit trillions of bits per second

Guided media is not affected by electromagnetic fields and can transmit both analog and digital signals.

Guided media is used for data transmission over long distance.

Unguided Media has multipath interference, due to reflections from land, water, natural and human-made objects.

That is why guided communication medium is more reliable than unguided medium.

v. What is meant by transmission impairment?

Ans: Transmission Impairments:

The errors that occur during data communication from one point to another are called transmission impairments.

When a signal is transmitted over a communication medium, it may have different types of impairments. Impairments occur due to imperfect characteristics of communication medium As a consequence, the received and the transmitted signals are not always the same.

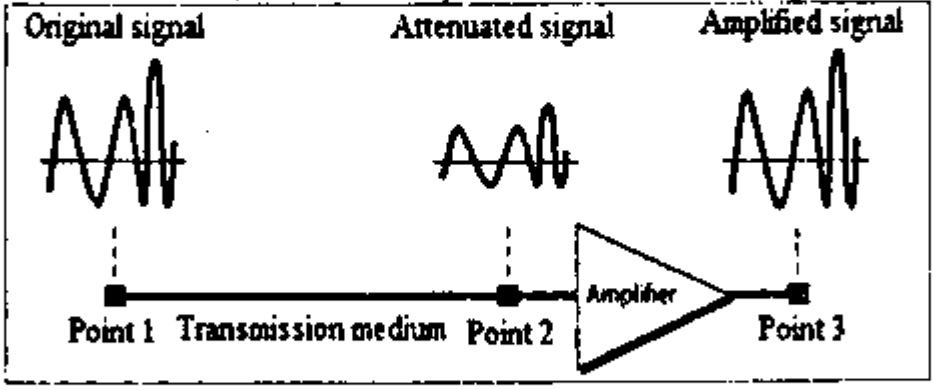
Types of impairments: The types of impairments in communication media are:

i. Attenuation **ii.** Amplification **iii.** Distortion **iv.** Cross talk

vi. Differentiate between attenuation and distortion.

Ans: Attenuation:

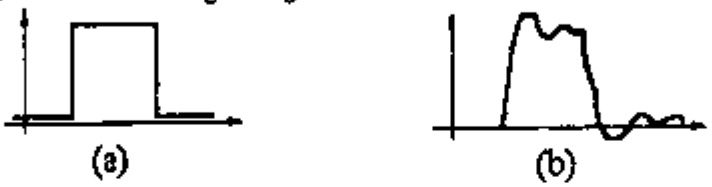
Attenuation is the fall of signal strength with the distance as signal travels through the communication media. If the attenuation is too much, the receiver may not be able to detect the signal at all.



Attenuation in data communication

Distortion:

Communication line delays the signal frequency by different amounts because different frequency components travel at different speed. Therefore, various frequency components of a signal are received at different delays. This causes distortion in digital signals.



Distortion in digital signal

vii. What is cross talk?

Ans: Cross Talk:

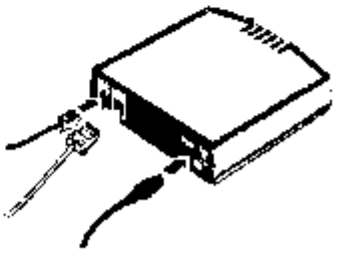
Cross talk occurs in guided media. As signal is transmitted through a wire, undesired signals enter the path of the transmitted signal due to electromagnetic radiation. It is caused because of putting several wires together in a single cable.

Sometimes, user can hear another conversion in the background when talking on the phone. This happens by the coupling between two wires that are close to each other.

viii. What is Dial-up modem? Why is it used?

Ans: Dial-up Modem:

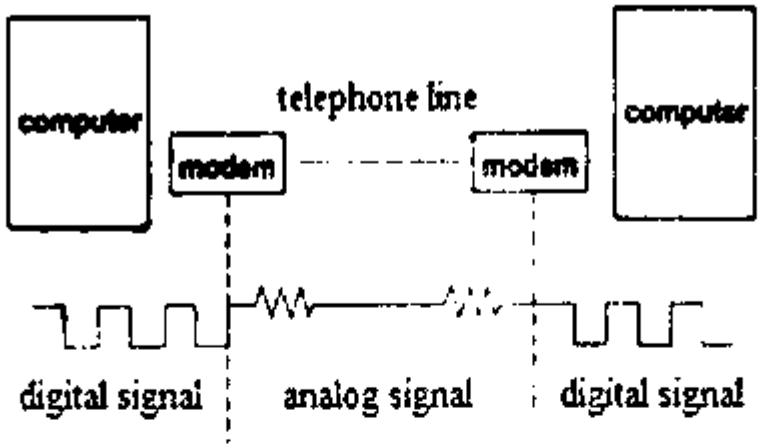
Dial-up modem provides Internet connection through telephone line. Maximum speed of Dial-up modem is 56 Kilobits per second which is very slow. It is being replaced by faster DSL connection for Internet. A Dial-up modem is shown in Fig.



Dial – up modem

Uses of Dial-up Modem:

A telephone line is used for voice transmission which is analog signal. A modem converts digital computer signal to analog form for transmission over telephone line as shown in Fig. This process is called modulation.



Transmission of data using modem

Another, modem at the receiving end, converts the analog signal back to digital form which is called demodulation. Modem is abbreviation of *Modulator-Demodulator*.

ix. Define data rate and baud rate.

Ans: Data Rate:

Data rate is the speed with which data can be transmitted from one device to another. It is generally measured in Kilobits (thousand bits) or Megabits (million bits) per second.

Note: The abbreviation kbps, is used for kilobits per second and mbps for million bits per second.

Baud Rate:

Baud is the rate of change of electrical signals per second during data communications. An electrical signal can have two or more than two states to represent binary digits 0 and 1.

For example, the analog signals generated by modem can have four voltage levels such as 1, 2, 3 and 4 Volts. There are four states of analog signal one for each voltage level. These four voltage levels can be used to represent 00, 01, 10 and 11. These will double the bit transfer rate

x. Define bandwidth.

Ans: Bandwidth:

Bandwidth describes the overall data transmission capacity of a medium or channel. It represents the amount of data that passes through a network connection per unit of time.

Bandwidth is also measured in bits per second like data rate

xi. Describe the different types of transmission media.

Ans: Types of Transmission Media:

There are two types of transmission media, Guided Media and Unguided Media.

Guided Media:

Guided media uses cabling system that guides the data signals along a specific path. Different types of guided media are twisted pair, coaxial cable and Fibre optic cable.

Unguided Media:

Unguided media signals travel through open space and nothing guides them along any specific path

xii. Why do satellites stay in orbit and never fall on the earth?

Ans: This is the law of inertia. The force of gravity acts upon a high speed satellite to deviate its trajectory from a straight-line inertial path. Indeed, a satellite is accelerating towards the Earth due to the force of gravity. Finally, a satellite does fall towards the Earth: only it never falls into the Earth.

xiii. Describe Signal-to-Noise Ratio.

Ans: Signal-to-Noise Ratio:

Signal-to-noise ratio is the ratio of signal power to the noise power that causes errors in data transmission. In other words, it means the ratio of useful data transmission to errors caused by noise over a transmission medium.

The measurement of Signal-to-noise ratio defines the data transmission quality of a communication medium.

If a transmission line has Signal-to-noise ratio higher than **1:1** that means more signal transmission than noise.

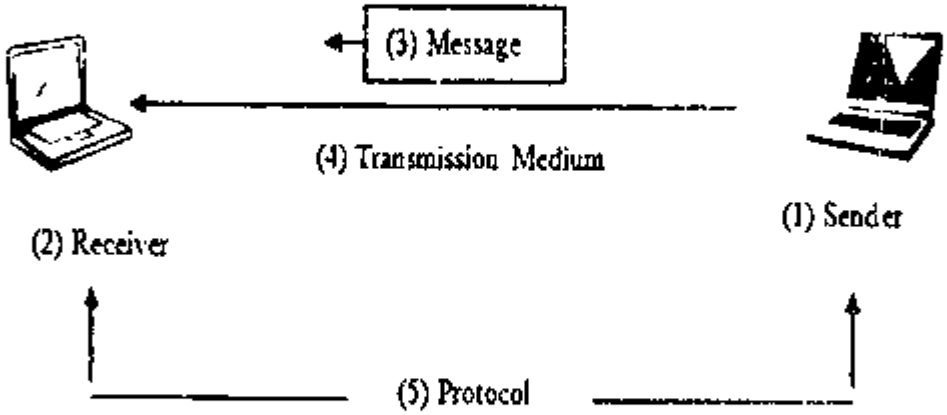
SECTION – C

Note: Attempt any TWO questions. Each question carries equal marks. (2 × 8 = 16)

Q3. a. Describe the components of communication system with the help of diagram.

Ans: Components of a Communication System:

Communication system consists of the following five basic components as shown in Fig.



Components of a communication system

- **Sender** - **Receiver** - **Message** - **Transmission Medium** - **Protocol**

Sender: It is the device which sends the message. In other words, it is the source of message that can be a computer, telephone handset, etc.

Transmission Medium:

It is the physical pathway (also known as channel) over which the message is sent from sender to receiver. Some examples of transmission media are coaxial cable, Fibre optic cable, microwaves, etc.

Protocol: It is the set of rules between the two communicating devices that governs the process of data communication. Without a protocol, two devices may be connected but they cannot communicate with each other.

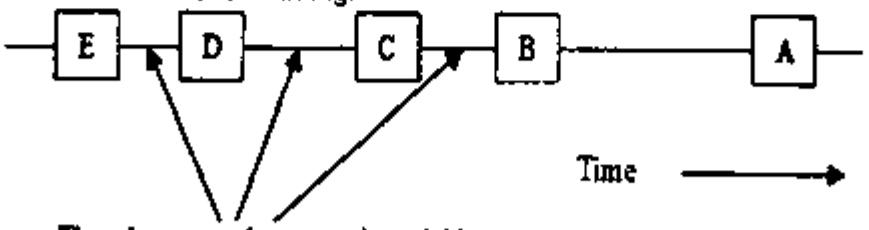
b. Explain asynchronous and synchronous transmission modes with examples.

Ans: Asynchronous and Synchronous Transmission modes:

Asynchronous and synchronous transmissions are the methods by which characters are transferred between components within the computer or between the computer and an external network.

Asynchronous Transmission:

The transmission mode in which time interval between each character is not the same is known as asynchronous transmission. This is shown in Fig.

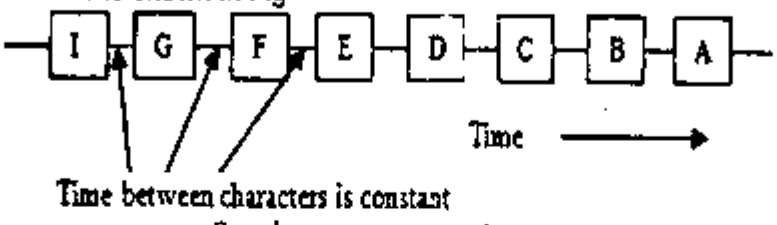


Asynchronous transmission

- In asynchronous transmission, each character is transmitted with additional control information. Control information consists of additional start and stop bits. Start bit indicates that transmission is about to start and stop bit indicates that it is about to stop.
- Start bit is generally 0 and stop bit is 1.
- Between the start and stop bits, the bits representing a character are transmitted at uniform time intervals.
- Asynchronous transmission is slow because of the additional bits transmitted with each character. It is suitable for low speed connection between system unit and keyboard or mouse.

Synchronous Transmission:

The transmission mode, in which time interval between the characters is always the same, is known as synchronous transmission. This is shown in Fig



Synchronous transmission

- In synchronous transmission, there is no control information added with the characters.
- Data consisting of 0s and 1s is transmitted as one long stream of bits. The receiver counts the bits as they arrive and recognizes the characters
- Synchronous transmission is faster than asynchronous transmission because it does not require extra start and stop bits. Therefore, it is used for fast data communication between computers in computer networks.

c. List the data transmission terminologies.

Ans: Communication Terminologies:

Communication Terminologies refers to terms or words that are related with data transmission or characteristics of communication channel.

Data Transmission Terminologies:

The following terms are used to describe the data transmission

Q4. a. Describe the following guided media.

i. Twisted pair cable ii. Coaxial cable iii. Fiber optic cable

Ans: i. Twisted pair cable:

Twisted pair cable is the most commonly used cable for data communication. It consists of pairs of copper wires twisted around one another as shown in Fig.

Purpose of twisting the cables:

The purpose of twisting the cables is to reduce cross talk and electromagnetic interference and make the transmission more reliable.

Telephone cable consists of two twisted insulated wires.

Computer network cable consists of 4 pairs of twisted cables.

Twisted pair cable

Transmission speed of twisted pair cable:

Transmission speed of twisted pair cable ranges from 2 million bits per second to 10 billion bits per second.

ii. Coaxial cable:

Coaxial cable is used for local area networks and cable television systems. It consists of copper wire surrounded by insulating layer.

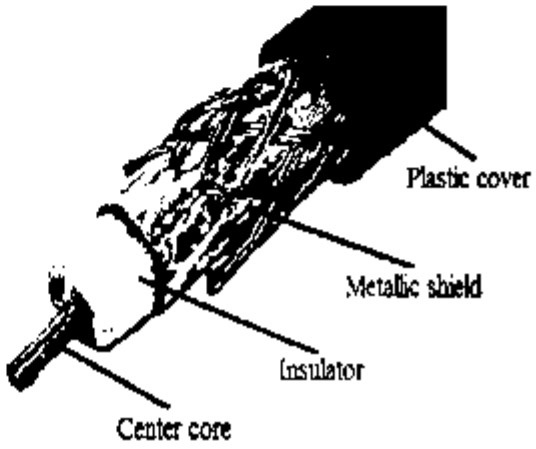
The insulating layer itself is surrounded by conductive layer as shown in Fig.

Purpose of Insulation:

Insulation reduces interference and distortion.

Transmission speed Coaxial Cable:

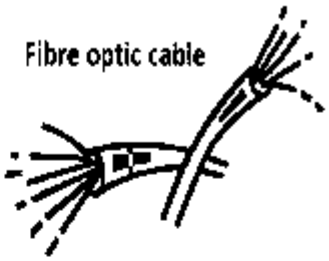
Transmission speed ranges from 200 million bits per second to more than 500 million bits per second.



Coaxial cable

iii. Fiber optic cable:

Fibre optic cable consists of smooth hair-thin strands of transparent material. In Fibre optic communication, the transmitter has a converter that converts electrical signals into light waves. These light waves are transmitted over the Fibre optic cable. Another converter is placed at the receiving end that converts the light waves back to electrical signals.



Fibre optic cable

Capacity of single Fibre optic cable:

A single Fibre optic cable can carry up to 50,000 communication lines. It provides high quality transmission at extremely fast speed. It can transmit trillions of bits per second.

It is not affected by electromagnetic fields and can transmit both analog and digital signals.

Note: Fiber optic cable is more expensive than twisted pair and coaxial cables. It is used for data transmission over long distance. Fibre optic cable is shown in Fig.

b. Describe any three types of unguided media.

Ans: See Q4. FBISE Paper (2017), Page # 73.

Q5. a. Describe the functions of the following communication devices.

i. Router ii. Network Interface Card (NIC)

iii. Switch/Access point

Ans: i. Router:

Router is a communication device that is used when two networks have to be connected for communication. They send information from one network to another by selecting the best pathway available.

Wireless router

Types of routers:

ii. Network Interface Card (NIC):

A Network Interface Card (NIC) or simply network card is used to connect computers together to create computer network. It makes communication between computers possible.

It is a card that is installed on the motherboard. In modern computers, it is integrated on the motherboard.

Types of network cards:

There are two types of network cards, wired network card and wireless network card. Wired and wireless network cards are shown in Fig

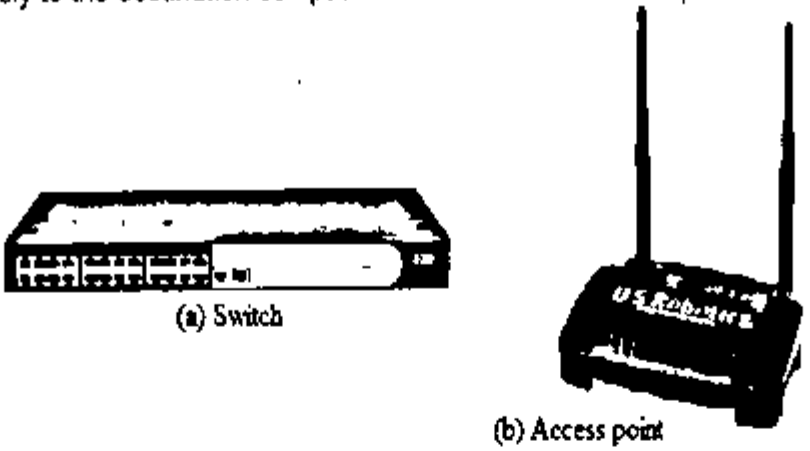
(a) Wired Network Card (b) Wireless Network Card

Network cards

iii. Switch/Access Point:

A switch/access point is used for connecting computers together in local area network (LAN). Switch is used in wired networks whereas access point is used in wireless networks.

A switch/access point receives information from a computer in the network, inspects it and then transmits it appropriately to the destination computer. A switch and an access point are shown in Fig.



(a) Switch (b) Access point

Switch and access point

b. Use appropriate formulae to determine the characteristics of a communication channel.

Ans: Characteristics of Communication Channel:

The maximum number of bits that can be transmitted over a communication line is a characteristic of transmission media. If more bits per second are transmitted than the line is capable of, some information will be lost due to transmission errors.

The baud rate can be calculated as:

$$Baud\ rate = Number\ of\ signal\ changes\ per\ second$$

The baud rate and data transmission rate measured as bits per seconds are not always the same.

For example, the Baud rate of a transmission line that uses modem is 28 kbps. If the electrical signal has two states to represent binary digits 0 and 1, then the Baud rate and data rate are the same.

If the electrical signal has four states to represent 00, 01, 10 and 11 as mentioned earlier, then Baud rate and data rate will not be the same.

GUESS PAPER & MODEL PAPER # 4

Based on Chapter # 05 (Reduced Syllabus)

COMPUTER NETWORKS

SECTION – A (Marks 12)

Time allowed: 20 Minutes Total marks: 12

NOTE: Section-A is compulsory. All parts of this section are to be answered on the question paper itself. It should be completed in the first 20 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q.1 Circle the correct option i.e. A / B / C/ D. Each part carries one mark.

i. **In which of the following transmission mode, information is transmitted in both directions but not simultaneously?**
A. Simplex mode B Half-duplex mode
C. Full-duplex mode D. High speed mode

ii. **In which of the following network, every computer can act as client, server or both at the same time?**
A. Client/server network B. Peer-to-peer network
B. Point-to-Point network D. Local area network

iii. **Which of the following network provides centralized security?**
A. Client/server network B. Peer-to-peer
C. Point-to-Point network D Local area network

iv. **Which of the following computer shares resources on a network for others to use?**
A. Desktop computer B. Client
C. Server D. Microcomputer

v. **Which of the following topology is most expensive to implement?**
A. Star B. Bus C. Ring D. Mesh

vi. **In which of the following network topology, switch is required?**
A Star B. Bus C. Ring D. Mesh

vii. **Which of the following network is used to provide Cable TV and Internet services?**
A. Local area network B. Wide area network
C. Metropolitan area network D. Point-to-Point network

viii. **Which of the following provides high speed Internet connection?**
A. Dial-up connection B. DSL connection
C. ISDN connection D. CDMA connection

ix. **Which of the following network connects computers across cities, countries and continents?**
A. Local area network B. Wide area network
C. Metropolitan area network D. Client/Server network

x. **Which of the following network topology uses a device called terminator?**
A. Ring topology B Mesh topology
C. Bus topology D. Star topology

xi. **Which topology requires multipoint connection?**
A. STAR B. MESH C. RING D. BUS

xii. **ISDN provides a maximum speed of 128 Kbps which is more than Dial-up connection but**

COMPUTER SCIENCE (SSC-I)

Time allowed: 2:40 Hours Total Marks section B & C = 43

Note: Answer any nine parts form Section 'B' and attempt any two questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet-B if required. Write your answers neatly and legibly.

SECTION – B (Marks-27)

Q.2 Attempt any NINE parts. The answer to each part should not exceed 3 to 4 lines each. (9 × 3 = 27)

i. Describe any three difficulties a company may face in running a business without having computer network.
ii. What is meant by data transmission?
iii. Differentiate between Half-duplex and Full-duplex transmission modes.
iv. Define network architecture?
v. Differentiate between a server and a client computer.
vi. Compare LAN and WAN.
vii. Why star topology is more reliable than bus or ring topologies?
viii. Mention any three problems which may occur if peer-to-peer network is used for a large number of users in an organization.
ix. What is ISDN?
x. What is CDMA technology?
xi. Write a note on Point-to-Point networks.
xii. What is meant by communication over network?
xiii. Write a note on communication via telephone networks.

SECTION – C (Marks-16)

Note: Attempt any TWO questions. Each question carries equal marks. (2 × 8 = 16)

Q3. a. What are the advantages of using networks?
b. Describe Client/Server and Peer-to-Peer networks.
Q4. a. Describe the types of networks based on area covered.
b. Explain the types of network topologies.
Q5. a. Write a note on Dial-up and DSL Internet connections.
b. Compare data communication lines on the basis of transfer rate, cost per month, advantages and disadvantages.

SOLUTION OF GUESS PAPER & MODEL PAPER # 4 (Reduced Syllabus)

SECTION – A (MCQs)

i. B	ii. B	iii. A	iv. C	v. D	vi. A
vii. C	viii. B	ix. B	x. C	xi. D	xii. A

SECTION – B

Q.2 Attempt any NINE parts. The answer to each part should not exceed 3 to 4 lines each.

File sharing:

A network makes it easy for everyone to access the same file and prevents people from accidentally creating different versions.

Printer sharing:

If you use a computer, chances are you also use a printer. With a network, several computers can share the same printer.

Share office equipment:

Instead of having one printer, one fax and one scanner per person, you can have just one of each for the whole office if you have them set up to be shared in the network. It is much more cost efficient than individual computers having their own printer.

Communication and collaboration:

It's hard for people to work together if no one knows what anyone else is doing. A network allows employees to share files, view other people's work, and exchange ideas more efficiently.

Data protection:

You should know by now that it's vital to back up your computer data regularly.

As you can see, the advantages of a computer network in your business are numerous and that is the reason it is so popular nowadays. It enhances productivity by using connectivity and sharing of files.

Due to above discussion it is clear that a company may face difficulties in running a business without having computer network.

ii. What is meant by data transmission?

Ans: Data Transmission:

Data transmission is the process of sending data from one device to another. It consists of sender, receiver and the medium which carries the information.

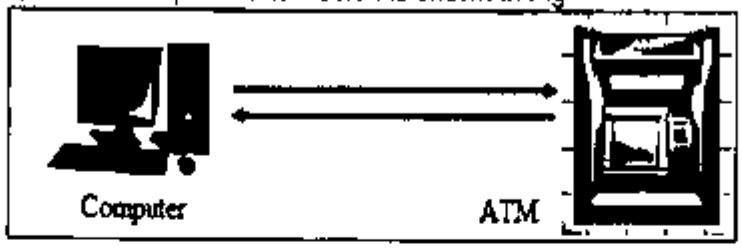
There are three modes of data transmission which are simplex, Half-duplex and Full-duplex.

iii. Differentiate between Half-duplex and Full-duplex transmission modes.

Ans: Half-duplex Transmission Mode:

A Half-duplex mode can send and receive data/information in both directions but not simultaneously. During data transmission, one end is the sender and the other is receiver.

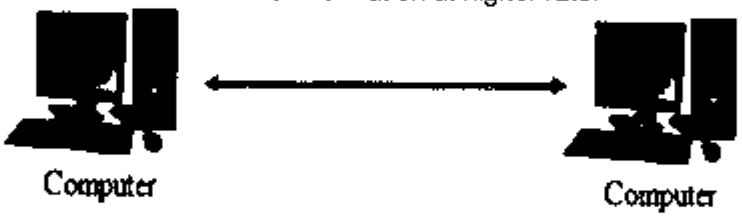
Examples: Half-duplex transmission is used in ATM machines for withdrawal of cash, money transfer and paying bills, etc. Half-duplex transmission is shown in Fig



Transmission through Half – duplex mode

Full-duplex Transmission Mode:

A Full-duplex mode is used to transmit data/information in both directions simultaneously as shown in Fig. A Full-duplex mode can transmit more data/information at higher rate.



Transmission through Full – duplex mode

Examples: Examples of Full-duplex mode are communication between computers in a network and communication over telephone line.

iv. Define network architecture?

Ans: Network Architecture:

A computer network can be as small as two computers linked together by a single cable whereas large networks connect thousands of computers and other devices.

Types of Network Architectures:

Three types of network architectures are commonly used which are:

- Client/server network
- Peer-to-peer network
- Point-to-point network

v. Differentiate between a server and a client computer.

Ans: Server Computer:

A Server is a main computer in a network which is used to manage network resources and facilitates other computers.

Client Computer:

Clients are computers in a network that access services made available by a server.

In a client/server network, each computer on the network acts as either a server or a client. Servers are not used as client computers and client computers are not used as servers.

In a client/server network, server shares its resources such as hard disk, printers and Internet connection with client computers.

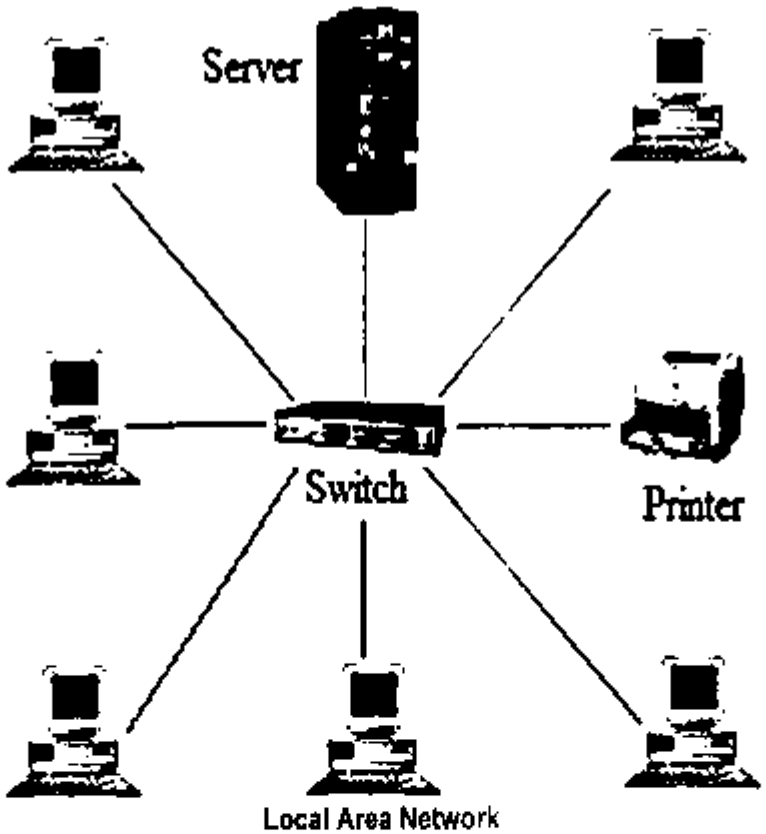
vi. Compare LAN and WAN.

Ans: Local Area Network (LAN):

Local area network is commonly used network. It is a network that covers a limited area, usually ranging from a small office to a campus of nearby buildings.

Examples:

Examples of LAN include networks within a school, college, business and organization. A local area network is shown in Fig.



Local Area Network

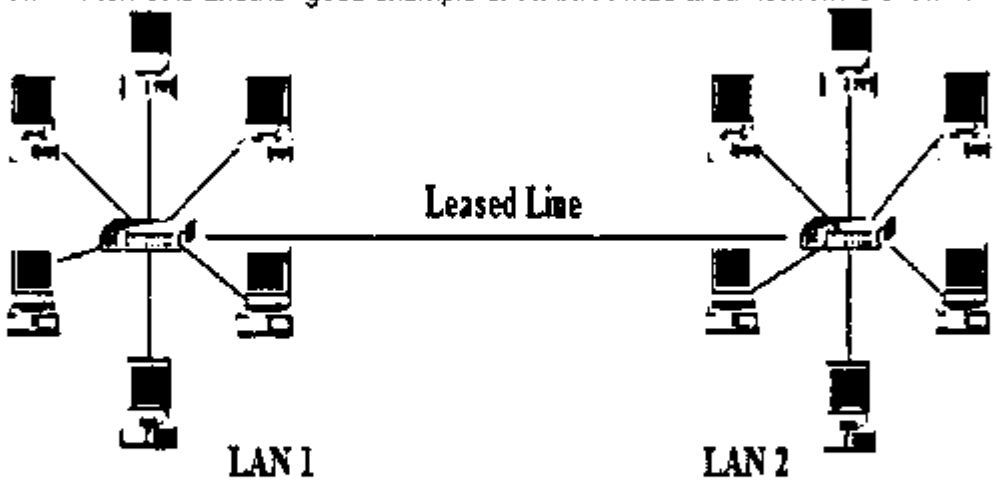
Characteristics of LAN:

i) LAN is restricted to a limited geographical area.
ii) Data transmission speed is fast.
iii) Data communication problems rarely occur.
iv) Transmission medium is owned by the user organization

Wide Area Network (WAN):

Examples:

Examples of WAN are the networks used in banks, airlines and national database authorities like NADRA in Pakistan Internet is another good example of WAN. A wide area network is shown in Fig.



Wide Area Network

Characteristics of WAN:

i) WAN spans large geographical area. It can connect computers between cities and countries.
ii) Data transmission speed is slow
iii) Data communication problems often occur.
iv) Transmission medium is leased lines or public systems such as telephone lines or satellite links.

vii. Why star topology is more reliable than bus or ring topologies?

Ans: **Due to following reasons** star topology is more reliable than bus or ring topologies.

- Provides fast communication between computers.
- Easy to connect new devices to the network.
- Easy to detect and fix faults.
- Failure of one computer does not stop functioning of the entire network.

viii. Mention any three problems which may occur if peer-to-peer network is used for a large number of users in an organization.

Ans: **Problems of Peer-to-Peer Networks:**

i) In a peer-to-peer network, each computer can play the role of server, client or both at the same time.
ii) Peer-to-peer networks are suitable for a small number of users, ranging between two to ten computers. Large peer-to-peer networks become difficult to manage.
iii) It does not provide centralized security. No single person is assigned to administer the resources of network. Individual users have complete control over resources of their computers.

ix. What is ISDN?

Ans: **ISDN:**

ISDN stands for Integrated Services Digital Network. It provides a maximum speed of 128Kbps which is more than Dial-up connection but less than DSL. It can transmit both voice and data at the same time over a single cable. It requires that the user has ISDN digital telephone service from telephone company and uses a faster modem than Dial-up modem. ISDN service is being replaced by faster DSL service.

x. What is CDMA technology?

Ans: **CDMA Technology:**

CDMA stands for Code Division Multiple Access It is a wireless cellular communication technology. CDMA services include short messaging, voice, data and video transmission. It can provide speed of several Mbps for video transmission.

xi. Write a note on Point-to-Point networks.

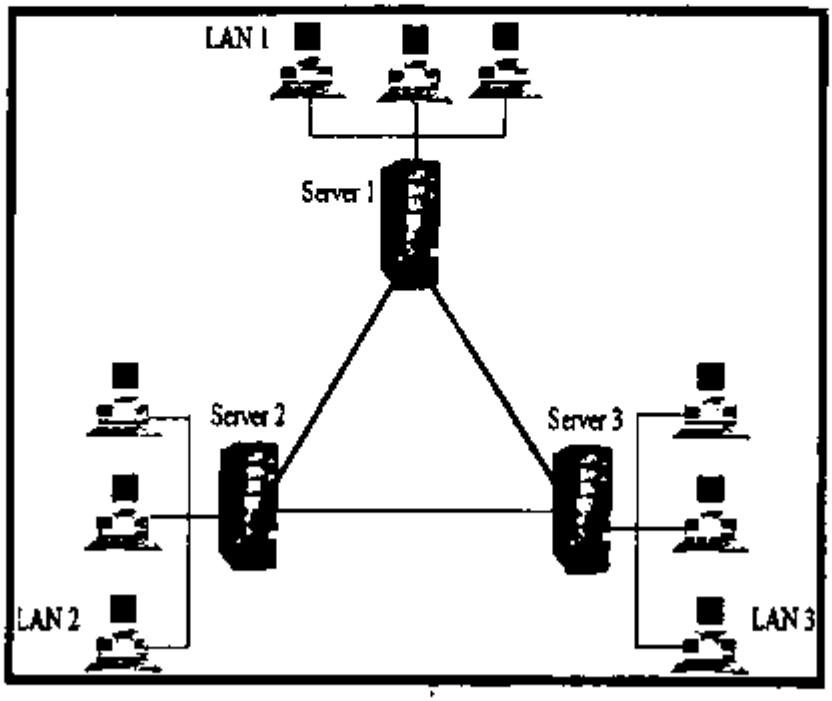
Ans: **Point-to-Point Networks:**

It is a type of network in which a message is sent from one computer to another via other computers in

Characteristics of Point-to-Point Networks:

i) Point-to-Point networks are generally used for long distance communication.

ii) There may be different paths for transmission of information.



A Point – to – Point Network

xii. What is meant by communication over network?

Ans: Communication over Networks:

Communication over network refers to transmission of data/information from one computer to another through a communication medium.

xiii. Write a note on communication via telephone networks.

Ans: Communication via Telephone Networks:

Telephone network is now commonly used for data communications. The main reason for using telephone network is that it exists all over the world.

Types of communication lines are provided via telephone networks:

Following four types of communication lines are provided via telephone networks.

- Dial-up line
- Integrated Services Digital Network (ISDN) lines
- Digital Subscriber Line (DSL)
- Code Division Multiple Access (CDMA)

SECTION – C

Note: Attempt any TWO questions. Each question carries equal marks. (2 × 8 = 16)

Q3. a. What are the advantages of using networks?

Ans: Advantages of using networks:

The following are some common uses of networks.

Hardware Sharing:

Network allows sharing of computer hardware such as hard disk and printer. A hard disk can be attached to a server to share it with other network users. A single hard disk can provide storage space to many users. A printer can also be connected to a computer to share it with all the other computer users across the network. Every user on network can use it for printing documents and there is no need to buy a printer for every user.

Software Sharing:

Application software can be installed on a server and shared over the network. There is no need to install it on all the computers in network.

Users can access, view and modify information stored on another computer in the network

Internet Sharing:

A single high speed Internet connection can be shared with all the users over a network. There is no need to provide a separate Internet connection to every user on the network

b. Describe Client/Server and Peer-to-Peer networks.

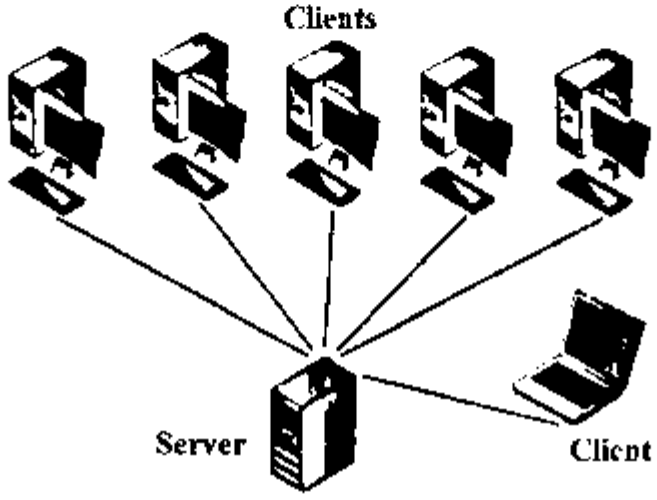
Ans: Client/Server Network:

A Server is a main computer in a network which is used to manage network resources and facilitates other computers

Clients are computers in a network that access services made available by a server

In a client/server network, each computer on the network acts as either a server or a client. Servers are not used as client computers and client computers are not used as servers

In a client/server network, server shares its resources such as hard disk, printers and Internet connection with client computers. A client/server network is illustrated in Fig.



Client/Server Network

Characteristics of Client/Server Networks:

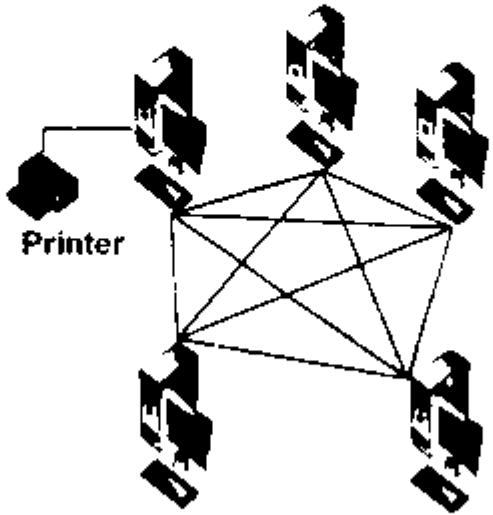
i) Client/server network can be as small as two computers and it can have hundreds and even thousands of computers as well.

ii) It provides centralized security to ensure that resources are not accessed by unauthorized users.

iii) In a client/server network, a person known as Network Administrator is responsible for sharing resources, creating user accounts and assigning privileges to all the users of the network

Peer-to-Peer Network:

In Peer-to-Peer network all computers have the same status. Every computer is capable of playing the role of client, server or both at the same time. Each computer on the network is known as peer. A peer on the network can share as well as access available resources on the network. Peer-to-peer network is illustrated in Fig.



ii) Peer-to-peer networks are suitable for a small number of users, ranging between two to ten computers. Large peer-to-peer networks become difficult to manage

iii) It does not provide centralized security No single person is assigned to administer the resources of network. Individual users have complete control over resources of their computers.

Q4. a. Describe the types of networks based on area covered.

Ans: See Q5. FBISE Paper (2020), Page # 103.

b. Explain any two types of network topologies.

Ans: See Q4. FBISE Paper (2020), Page # 101.

Q5. a. Write a note on Dial-up and DSL Internet connections.

Ans: Dial-up Line:

Dial-up line uses standard telephone lines for Internet connection. It requires a Dial-up modem that provides a maximum Internet connection speed of 56Kbps

The main advantage of using Dial-up line is that it uses complex network of telephone lines that allows data to be transmitted to almost any location in the world It is becoming outdated due to very slow Internet connection

DSL:

DSL (Digital Subscriber Line) provides a very high speed broadband Internet connection. It is called broadband because it has broad range of frequencies for transmitting digital data

Broadband:

Any type of Internet speed that is 256Kbps or above is known as broadband

A DSL modem is required for setting up the DSL Internet connection Internet Service Providers (ISPs) have several DSL speeds available with different monthly rates.

b. Compare data communication lines on the basis of transfer rate, cost per month, advantages and disadvantages.

Ans: Comparison between Data Communication Lines:

Dial-up Line:

- Maximum speed is 56 Kbps
- Easily available anywhere, no extra lines required
- Cheaper than other Internet services
- Internet connection is not permanently available.
- Voice communication is not possible while using Internet

DSL (Digital Subscriber Line):

- Typical speed is 256Kbps or above
- DSL connection is always available
- Telephonic conversation and Internet access are available simultaneously.
- Costly than other types of Internet services
- Various monthly rates are charged depending on the speed
- Connection is available as soon as computer and DSL modem are turned on.

ISDN (Integrated Services Digital Network):

- Maximum communication speed is 128 Kbps
- Costs more than Dial-up service
- Can simultaneously transmit both voice and data
- Allows multiple devices to share a single line

CDMA (Code Division Multiple Access):

GUESS PAPER & MODEL PAPER # 5

Based on Chapter # 06 (Reduced Syllabus)

COMPUTER SECURITY AND ETHICS

SECTION – A (Marks 12)

Time allowed: 20 Minutes Total marks: 12

NOTE: Section-A is compulsory. All parts of this section are to be answered on the question paper itself. It should be completed in the first 20 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q.1 Circle the correct option i.e. A / B / C/ D. Each part carries one mark.

i. **What is a person who illegally breaks into others' computer systems called?**
A Computer engineer B System programmer
C. Hacker D. Cracker

ii. **What is a person who uses special tools for breaking into computer systems called?**
A. Computer engineer B System programmer
C. Hacker D. Cracker

iii. **Which malware spreads automatically in computer networks and replicates itself?**
A Virus B Worm C Adware D Spyware

iv. **Which of the following malware displays advertisements on the screen?**
A. Virus B Worm C. Adware D Trojan

v. **Which of the following authentication method is used for opening security gates?**
A. Username and password B Personal Identification Number
C Access card D. Biometrics

vi. **Which of the following authentication method is most reliable?**
A Username and password B. Personal Identification Number
C. Access card D Biometrics

vii. **Which of the following authentication method is based on features of individuals such as face, fingerprint and voice?**
A. Username and password B Personal Identification Number
C. Access card D. Biometrics

viii. **What is making illegal copies of copyright software for use on other computers or sale called?**
A. Information privacy B Intellectual rights
C. Software piracy D Information ownership

ix. **Which of the following malware gathers information about user activities on computer?**
A Virus B Worm
C. Adware D. Spyware

x. **Which of the following authentication methodology is used to draw cash from ATM?**
A Username and password B. Personal Identification Number
C. Access card D Biometrics

xi. **Which of the following would be considered as a way that a computer virus can enter a computer system?**
A. E-mail and file attachments B Downloaded copies of games
C. Downloaded copies of shareware D All of the above

xii. **A malicious program that is not self replicating is called a:**

COMPUTER SCIENCE (SSC-I)

Time allowed: 2:40 Hours | Total Marks section B & C = 43

Note: Answer any nine parts form Section 'B' and attempt any two questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet-B if required. Write your answers neatly and legibly.

SECTION – B (Marks-27)

Q.2 Attempt any NINE parts. The answer to each part should not exceed 3 to 4 lines each. (9 × 3 = 27)

i. Define cybercrime.
ii. What is the importance of computer security?
iii. Differentiate between hacker and cracker.
iv. Describe any five symptoms of malware.
v. Differentiate between authentication and authorization.
vi. Which authentication methodology provides highly secure identification and verification? Justify your answer.
vii. What is meant by information privacy?
viii. Give any three drawbacks of software piracy?
ix. What types of problems may be faced if computer users do not comply with the moral guidelines of computer ethics?
x. Name any three places where authentication of people is required.
xi. Describe some commonly committed cybercrimes.
xii. What are computer viruses?
xiii. Describe the term multimodal authentication.

SECTION – C (Marks-16)

Note: Attempt any TWO questions. Each question carries equal marks. (2 × 8 = 16)

Q3. a. Define malware and describe its types.
b. Explain how malware spreads.

Q4. a. Explain how to protect computer systems from virus attacks.
b. What are the common methodologies used for authentication?

Q5. a. Define computer ethics and write some important moral guidelines for ethical use of computer technology.
b. Describe some commonly committed cybercrimes.

SOLUTION OF GUESS PAPER & MODEL PAPER # 5 (Reduced Syllabus)

SECTION – A (MCQs)

i. C	ii. D	iii. B	iv. C	v. C	vi. D
vii. D	viii. C	ix. D	x. B	xi. D	xii. C

SECTION – B

Q.2 Attempt any NINE parts. The answer to each part should not exceed 3 to 4 lines each. (9 × 3 = 27)

i. Define cybercrime.

ii. What is the importance of computer security?

Ans: Computer Security:

Computer security refers to protecting computer hardware, software and information stored on computer from threats

Importance of Computer Security:

Computer users often exchange information with each other or communicate over Internet This can infect a user's computer with virus or other types of malicious software.

Computer security or safety is important for computer users to protect their computer from different threats It is necessary to install security software such as firewall, antivirus and spyware on computers

iii. Differentiate between hacker and cracker.

Ans: Hacker:

A person who illegally breaks into others' computer systems is known as hacker Hacking is a cybercrime.

- Hackers are computer experts who try to gain unauthorized access to computer systems for stealing and corrupting information.
- Most of the hackers break into computers for financial benefits They try to get credit cart details or bank account information so that they can steal money
- Hackers have in-depth knowledge of network programming and can create tools and malicious software for others to break into networks and create problems.

Example:

For example, a hacker develops software in which a dictionary file is loaded that contains all the dictionary words. When the software is run it tries all the dictionary words one by one as password to hack a computer This method works if the user is having a simple password that exists in the dictionary.

Cracker:

Cracker is a computer user who breaks into computer systems without permission using hacking tools for personal gain or damage and commits cybercrimes.

- Most of the crackers do not have professional computer skill to hack computer systems but they have knowledge about using hacking tools
- Crackers break into computers and cause serious damage They also break into Web servers and replace the home page of a website with a page of their own design
- These criminals are dangerous and harder to catch

Example:

For example, a cracker can install a key logger on another user's computer through Internet A key-logger is software which records every typed letter on the keyboard. When the user uses Facebook and enters the Facebook account details, it will get recorded in the cracker's computer. Now, he can easily hack the Facebook account

iv. Describe any five symptoms of malware.

Ans: Common Symptoms of Malware Attacks:

A list of common symptoms of infected computers is given below

- The computer does not start or it reboots automatically when it is on.
- Different types of error messages appear on the screen
- Unexpected messages appear on the screen.
- Programs do not run in a normal way.
- Computer is running very slow.
- New files or folders are created on the hard disk
- Folders are deleted or changed on the hard disk
- Hard disk activity is noticed without running any program
- Web browser does not run in a normal way
- Strange noise is heard when the computer is on.

v. Differentiate between authentication and authorization.

Authorization:

Authorization means to give someone permission to do something

Example:

For example when a user wants to login to his email account, he is asked to enter username and password to verify his identity. This is authentication.

If correct username and password are entered, the user is authorized or allowed to check his emails, send email or perform other tasks related with email service. This is authorization

vi. Which authentication methodology provides highly secure identification and verification? Justify your answer.

Ans: Biometrics provides highly secure identification and personal verification technologies.

Biometrics refers to authentication methods based on physical characteristics of individuals such as features of face, hand geometry, retina, voice and fingerprint

Biometrics based systems are used for financial transactions, electronic banking and personal data privacy

Biometrics provides more accurate authentication than using username and password or PIN. Biometrics is associated with a particular individual. Hence, it cannot be borrowed, stolen or forgotten. Forging in biometrics is practically impossible.

vii. What is meant by information privacy?

Ans: Information Privacy:

Information privacy refers to an individual's right to the privacy of personal information. In modern information age, people are concerned that computers may be taking away their privacy

The Data Protection Act (Law) protects the rights of the individuals against misuse of personal information by organizations. Organizations that hold the information should not allow unauthorized people to have access to information or disclose it to anyone outside the organization

viii. Give any three drawbacks of software piracy?

Ans: Disadvantages/Drawbacks of software piracy:

Pirated Software:

Software piracy refers to making of unauthorized copies of copyrighted software and distributing it. Pirated software on CDs is a very common source of spreading malware on computers because these are often infected.

If users download pirated music, movies, programs etc. for free, their computers may be infected because pirated downloads often contain viruses, spyware or other malicious programs

OR (Second Answer)

1. **It's illegal**: making unauthorized copies of software is a federal crime
2. **It's risky**: if you downloading pirated software from internet, it is more likely to be infected with computer viruses which can damage your computer system.
3. They do not provide after-sales services
4. Software piracy slows the economic growth rates of developing because it discourages new software developers from entering the market and slows down the industry's ability to bring new and innovative solutions to consumers.
5. Downloading files illegally have a risk of viruses and Spyware! Pirated software can carry viruses or may not function at all.
6. Unlicensed users do not receive quality documentation. It also deprives consumers of the basic protections offered by properly licensed software like money-back guarantees, installation support, maintenance releases, and upgrade rebates.
7. Piracy can expose end-users to potential risks of identity theft if criminals who sell counterfeit software CDs obtain a buyer's name, address, credit card and other information during purchase. This increases identity theft risks

ix. What types of problems may be faced if computer users do not comply with the moral

2. Computer users can use Computer to break into others' computer systems to steal, change or destroy information.
3. Computer users can read documents and e-mails of other users without their consent.
4. Computer users can use Computer to make illegal copies of copyright software and sell it for financial benefit.
5. Computer users who have special computer knowledge and ability will create malicious software (such as computer virus) and spread it to other computers
6. Computer users can commit any type of crime with the help of computer technology.
7. Computer users can not respect the privacy of others.

x. Name any three places where authentication of people is required.

Ans: Username and password are used to authorize users to have access to computer systems, e-mail account, bank account and other services available on computer

PINS are most commonly used with debit and credit cards in retail stores and many other places for payment of bills. It is also used with ATM cards to withdraw cash from ATM machines.

Access cards are commonly used to open security gates in offices where unauthorized people are not allowed to enter. Access cards are also used to open barriers in parking areas. They are an alternative to key for opening hotel room, etc.

Biometrics provides highly secure identification and personal verification technologies Biometrics based systems are used for financial transactions, electronic banking and personal data privacy

xi. Describe some commonly committed cybercrimes.

Ans: Commonly committed cybercrimes:

The following are the commonly committed cybercrimes

i. Computers have been involved in crimes such as fraud kidnapping murder and crimes related with stealing money from bank and credit card company.
ii. Criminals use Internet to steal personal information of other users and commit various types of cybercrimes Personal information includes username, password, credit card number, bank account number, etc
iii. Downloading illegal software, music files and videos are also cybercrimes
iv. Internet harassment or cyber bullying is also a serious crime committed by cybercriminals Internet harassment includes sending threatening e-mail, spreading rumors or virus, making defamatory comments, sending pornography or other bad material
v. Making negative comments about an individual on Internet can damage reputation or cause physical or mental harm to the victim

xii. What are computer viruses?

Ans: Computer Viruses:

Some computer experts create malware such as virus spyware, worm etc and spread through Internet. It is very importance to understand how malware spreads and how to protect computer from them
It is very difficult to list all the symptoms of infected computers The reason for this is that there are hundreds and thousands of malicious programs and new ones are created every day Sometime, some infected computers do not show any symptom and the user thinks that his computer is not infected

xiii. Describe the term multimodal authentication.

Ans: Multimodal Authentication:

Multimodal authentication means combination of two or more types of authentication methods. Normally, authentication methods use a single source of information for authentication such as features of face, fingerprint, hand geometry, access cards, etc Multimodal authentication uses multiple sources of information for identification

For example, fingerprint and face recognition can be combined for a multimodal biometric authentication system As another example, a multimodal authentication can combine access card and PIN to open security gate

SECTION – C

b. Explain how malware spreads.

Ans: Spreading of Malware:

The following are different ways malware can spread in computers.

Infected Flash Drives/CDs:

Virus, spyware and other types of malware can infect computers in which anti-malware software is not installed through infected flash drives and CDs.

Pirated Software:

Software piracy refers to making of unauthorized copies of copyrighted software and distributing it. Pirated software on CDs is a very common source of spreading malware on computers because these are often infected.

If users download pirated music, movies, programs etc. for free, their computers may be infected because pirated downloads often contain viruses, spyware or other malicious programs

Network and Internet:

Computers connected to network get infected with malware when information is exchanged with other computers. Computers are also infected while using Internet when users download something or browse infected Web sites.

Computer may get infected with a virus or other malware if the user downloads software such as games, updates, demos and other programs from unreliable sources and installs it on the computer

E-mail Attachments:

Opening e-mail attachments from a stranger or from an unknown address can infect computer with malware. Even downloading and opening e-mail from a friend or family member can be dangerous They may pass the user a virus or other malware without knowing about it

Q4. a. Explain how to protect computer systems from virus attacks.

Ans: Protecting Computer from Malware/Virus Attacks:

We have to install the following software to safeguard computer against viruses, worms, adware and spyware

- Antivirus software
- Anti-spyware software

Antivirus Software:

Antivirus software is a computer program that detects and removes viruses and other types of malware.

- Computer user should install it on computer and update it regularly
- Most antivirus programs have an auto-update feature This feature automatically updates the antivirus program through Internet so that it can detect and remove new versions of viruses as well.
- Whenever a user connects a flash drive or any other type of storage device to computer, he must run it through antivirus software to ensure that it does not contain virus

Antivirus Programs:

Some commonly used antivirus programs are Norton Antivirus, Kaspersky Antivirus, AVG Antivirus, Bit Defender and McAfee Antivirus.

Anti-Spyware:

Anti-spyware is a computer program that detects spyware infections on computer and removes them. It helps to protect computer against security threats caused by spyware and other types of malware

- Computer user should install it in computer and regularly update it to safeguard computer against new threats
- Anti-spyware program runs in the background of computer and continually scans for spyware threats.
- A user can also start Anti-spyware program to scan computer to find and remove spyware.

Anti-spyware programs:

Some commonly used Anti-spyware programs are Norton Anti-spyware, SpySweeper, Spybot-Search & Destroy, Spyware Doctor, and AVG Anti-spyware

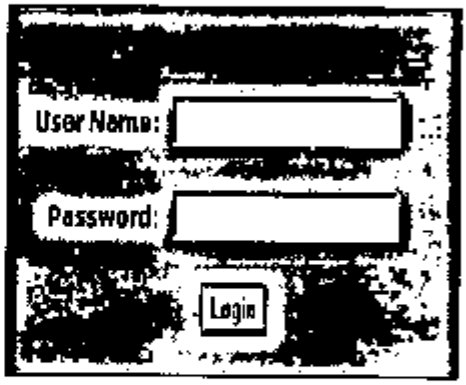
b. What are the common methodologies used for authentication?

- Personal Identification Number
- Access card
- Biometrics

Username and Password:

A username is a name that identifies a person on a computer system. Username is generally used with a password. The username and password combination is known as login information.

Username and password are used to authorize users to have access to computer systems, e-mail account, bank account and other services available on computer. Username is the known part of user's login information whereas password is secret. If it is known by a person it could be misused with bad intention. Window for entering login information is shown in Fig.



Window for entering username and password

Personal Identification Number (PIN):

PIN is a confidential numeric password used to authenticate a user to get access to a computer system. When a user enters the PIN, it is searched in the database stored in the computer. If it matches, the user is authorized to use the computer.

PINS are most commonly used with debit and credit cards in retail stores and many other places for payment of bills. It is also used with ATM cards to withdraw cash from ATM machines as shown in Fig

Entering PIN on ATM machine

Access Cards:

Access cards are very similar in appearance to credit cards. They do not require username, password or PIN. They are commonly used to open security gates in offices and many other places as shown in Fig, where unauthorized people are not allowed to enter. Access cards are also used to open barriers in parking areas. They are an alternative to key for opening hotel room, etc.

Using access card for opening door of hotel room

Biometrics:

Biometrics refers to authentication methods based on physical characteristics of individuals such as features of face, hand geometry, retina, voice and fingerprint as shown in Fig.

Fingerprint biometrics machine used for time and attendance

It provides highly secure identification and personal verificatron technologies. Biometrics based systems are used for financial transactions, electronic banking and personal data privacy.

It provides more accurate authentication than using username and password or PIN. Biometrics is

Q5. a. Define computer ethics and write some important moral guidelines for ethical use of computer technology.

Ans: Computer Ethics:

Computer ethics means an acceptable behavior for using computer technology. It is a code of behavior for moral and social issues while using computer technology. particularly Internet. Computer user should be honest, respect the rights of others on the Internet and obey laws that apply to online behavior.
We should not use bad language while chatting and social networking. We need to respect others views and should not criticize people.

We should not pretend as someone else and fool others We should not download copyrighted material such as music, movies, etc. People should not do something on the Internet that is morally objectionable or illegal.

Ethical Use of Computer:

The following are some important moral guidelines for ethical use of computer technology.

i. Computer should not be used to harm other people.
ii. Computer users should not break into others' computer systems to steal, change or destroy information.
iii. Computer users should not read documents and e-mails of other users without their consent.
iv. People should not make illegal copies of copyright software and sell it for financial benefit.
v. Computer users who have special computer knowledge and ability should not create malicious software (such as computer virus) and spread it to other computers.
vi. People should not commit any type of crime with the help of computer technology.
vii. Computer users should respect the privacy of others

b. Describe some commonly committed cybercrimes.

Ans: Commonly committed cybercrimes:

The following are the commonly committed cybercrimes

i. Computers have been involved in crimes such as fraud, kidnapping, murder and crimes related with stealing money from bank and credit card company.
ii. Criminals use Internet to steal personal information of other users and commit various types of cybercrimes. Personal information includes username password, credit card number, bank account number, etc.
iii. Downloading illegal software, music files and videos are also cybercrimes.
iv. Internet harassment or cyber bullying is also a serious crime committed by cybercriminals. Internet harassment includes sending threatening e-mail, spreading rumors or virus, making defamatory comments, sending pornography or other bad material
v. Making negative comments about an individual on Internet can damage reputation or cause physical or mental harm to the victim.

GUESS PAPER & MODEL PAPER # 6

Based on Whole Book (Reduced Syllabus) Federal Board SSC-I Examination (2021)

SECTION-A

Time allowed: 20 minutes Marks: 12

Note: Section-A is compulsory and comprises two pages. All parts of this section are to be answered on the question paper itself. It should be completed in the first 20 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q.1 Encircle the correct option i.e. A / B / C / D. All parts carry equal marks.

i. Which of the following is volatile memory?
A RAM B ROM
C. USB flash drive D. Hard disk

ii. Which layout was designed to let people type as quickly as possible without jamming a mechanical typewriter?
A QWERTY B. AZERTY C. JCUKEN D. Dvorak

iii. Which of the following Windows icon allows user to access a program, file or folder quickly?
A. Program icon B. Computer icon
C Shortcut icon D. Recycle Bin icon

iv. DOS stands for.
A. Dual Operating System B Disk Operating system
C. Division Operating System D. None of these

v. Which of the following device is used for connecting computers together in wired local area network?
A. Dial-up modem B. Router C. Switch D. Access point

vi. Which of the following device forwards information from one network to another by selecting the best pathway available?
A. Dial-up modem B Router C. Switch D. Access point

vii. Which of the following computer shares resources on a network for others to use?
A. Desktop computer B Client
C. Server D Microcomputer

viii. Which of the following topology is most expensive to implement?
A Star B. Bus C Ring D Mesh

ix. Which of the following malware gathers information about user activities on computer?
A. Virus B Worm C. Adware D Spyware

x. Which of the following authentication methodology is used to draw cash from ATM?
A. Username and password B Personal Identification Number
C. Access card D. Biometrics

xi. A malicious program that is not self replicating is called a:
A. Virus B. Worm
C Trojan horse D. All of the above self replicate

Time allowed: 2.40 hours Total Marks: 43

Note: Sections B and C comprise Pages 1-2. Answer all the questions from Sections 'B' and 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet-B if required. Write your answers neatly and legibly.

SECTION – B (Marks 27)

Q.2 Attempt any NINE parts from the following. All parts carry equal marks. (9 × 3 = 27)

i. Elaborate open source software, shareware and freeware.
ii. What do you know about RAM?
iii. Differentiate between Difference Engine and Analytical Engine.
iv. Define UNIX and Windows operating system.
v. Give any three objectives of operating system?
vi. Why digital signals are used in computer systems?
vii. Give any three reasons why guided communication medium is more reliable than unguided medium.
viii. List the data transmission terminologies.
ix. Differentiate between a server and a client computer.
x. Why star topology is more reliable than bus or ring topologies?
xi. Write a note on Dial-up and DSL Internet connections.
xii. Differentiate between hacker and cracker.
xiii. Differentiate between authentication and authorization.

SECTION – C (Marks 16)

Note: Attempt any TWO questions. (8 × 2 = 16)

Q3. a. What are the advantages of using networks?
b. Describe Client/Server and Peer-to-Peer networks.
Q4. a. Describe the components of communication system with the help of diagram.
b. Explain asynchronous and synchronous transmission modes with examples.
c. Use appropriate formulae to determine the characteristics of a communication channel.
Q5. a. Define computer ethics and write some important moral guidelines for ethical use of computer technology.
b. Describe some commonly committed cybercrimes.

SOLUTION OF GUESS PAPER & MODEL PAPER # 6 (Reduced Syllabus)

SECTION – A (MCQs)

i. A	ii. A	iii. C	iv. B	v. C	vi. B
vii. C	viii. D	ix. D	x. B	xi. C	xii. B

SECTION – B

Q.2 Attempt any NINE parts. The answer to each part should not exceed 3 to 4 lines each. (9 × 3 = 27)

i. Elaborate open source software, shareware and freeware.

Examples of open source software:

Some examples of open source software are Linux operating system, Open Office (office productivity software), Flight Gear (flight simulator) and Java programming language, etc

ii. Shareware:

Shareware is distributed free of cost for a limited period, usually one or two months. It is trial version of software given to people to decide whether they would like to buy the full version of the software

Some shareware is installed on new computers when they are sold.

Examples of shareware:

Examples of shareware are antivirus software and computer games, etc.

ii. Freeware:

Freeware is given free of cost and it is full version of software for an unlimited period of time. It may have some restrictions such as allowed for personal or academic use only.

Examples of freeware:

Examples of freeware are Google Chrome, Mozilla Firefox, VLC media player, etc.

ii. What do you know about RAM?

Ans: Random Access Memory (RAM):

RAM is high speed memory installed on the motherboard. It is READ/WRITE memory. Information can be read from or written into it. Programs are loaded into RAM from secondary storage devices such as hard disk or USB flash drive for execution by the microprocessor

Volatile memory:

RAM is volatile memory which means information stored in it, is lost when the computer is turned off.

RAM modules are installed in the memory slots on the motherboard RAM modules are shown in Fig.

iii. Differentiate between Difference Engine and Analytical Engine.

Ans: Difference Engine:

In 1822, the English mathematician Charles Babbage started working on a big calculating machine about the size of a room. He called it Difference Engine.

Analytical Engine:

Babbage worked for many years on Difference Engine but he could not complete it. Later, he came up with idea of Analytical Engine. He could not complete it because the technology was not advanced enough but he laid the foundation stone of modern digital computers.

Today's modern digital computers are based on the idea of analytical engine.

Father of modern digital computers:

Charles Babbage is known as the father of modern digital computers

iv. Define UNIX and Windows operating system.

Ans: UNIX:

UNIX Operating System:

UNIX is a multi-user CLI operating system introduced in 1969. It allows multiple users to run different programs at the same time. UNIX was developed for use on large computer system (Mainframe) It uses a command line interface but later Graphical User Interface was also introduced.

Windows Operating System:

Windows is the most popular operating system used on microcomputers. It was developed by Microsoft. Many different versions of Windows operating system were developed and used successfully in the past Some of these versions are Windows 95, Windows 98, Windows Millennium, Windows XP, Windows Vista, Windows 7, 8 and 10.

v. Give any three objectives of operating system?

Ans: Objectives of operating system (OS):

The main objectives of the operating system are convenience and efficiency. It makes the computer more convenient to use. It allows computer resources such as CPU, memory, input/output devices and Internet to be used in an efficient manner. It can be viewed as a resource manager.

Multiple bit (0,1) streams are used in a computer network. Digital data can be compressed relatively easily, thereby increasing the efficiency of transmission.

That is why digital signals are used in computer systems

vii. Give any three reasons why guided communication medium is more reliable than unguided medium.

Ans: The purpose of Guided media is to reduce cross talk and electromagnetic interference and make the transmission more reliable.

It provides high quality transmission at extremely fast speed. It can transmit trillions of bits per second.

Guided media is not affected by electromagnetic fields and can transmit both analog and digital signals.

Guided media is used for data transmission over long distance.

Unguided Media has multipath interference, due to reflections from land, water, natural and human-made objects.

That is why guided communication medium is more reliable than unguided medium.

viii. List the data transmission terminologies.

Ans: Communication Terminologies:

Communication Terminologies refers to terms or words that are related with data transmission or characteristics of communication channel.

Data Transmission Terminologies:

The following terms are used to determine the data transmission capabilities of a transmission media such as telephone line, coaxial cable, etc

- Data rate
- Baud rate
- Bandwidth
- Signal to Noise Ratio

ix. Differentiate between a server and a client computer.

Ans: Server Computer:

A Server is a main computer in a network which is used to manage network resources and facilitates other computers.

Client Computer:

Clients are computers in a network that access services made available by a server

In a client/server network, each computer on the network acts as either a server or a client. Servers are not used as client computers and client computers are not used as servers.

In a client/server network, server shares its resources such as hard disk, printers and Internet connection with client computers.

x. Why star topology is more reliable than bus or ring topologies?

Ans: Due to following reasons star topology is more reliable than bus or ring topologies.

- Provides fast communication between computers.
- Easy to connect new devices to the network
- Easy to detect and fix faults.
- Failure of one computer does not stop functioning of the entire network

xi. Write a note on Dial-up and DSL Internet connections.

Ans: Dial-up Line:

Dial-up line uses standard telephone lines for Internet connection. It requires a Dial-up modem that provides a maximum Internet connection speed of 56Kbps

The main advantage of using Dial-up line is that it uses complex network of telephone lines that allows data to be transmitted to almost any location in the world. It is becoming outdated due to very slow Internet connection.

DSL:

DSL (Digital Subscriber Line) provides a very high speed broadband Internet connection. It is called broadband because it has broad range of frequencies for transmitting digital data.

Broadband:

Any type of Internet speed that is 256Kbps or above is known as broadband

xii. Differentiate between hacker and cracker.

Ans: Hacker:

A person who illegally breaks into others' computer systems is known as hacker. Hacking is a cybercrime.

- Hackers are computer experts who try to gain unauthorized access to computer systems for stealing and corrupting information.
- Most of the hackers break into computers for financial benefits They try to get credit cart details or bank account information so that they can steal money.
- Hackers have in-depth knowledge of network programming and can create tools and malicious software for others to break into networks and create problems.

Example:

For example, a hacker develops software in which a dictionary file is loaded that contains all the dictionary words. When the software is run it tries all the dictionary words one by one as password to hack a computer. This method works if the user is having a simple password that exists in the dictionary.

Cracker:

Cracker is a computer user who breaks into computer systems without permission using hacking tools for personal gain or damage and commits cybercrimes

- Most of the crackers do not have professional computer skill to hack computer systems but they have knowledge about using hacking tools.
- Crackers break into computers and cause serious damage They also break into Web servers and replace the home page of a website with a page of their own design.
- These criminals are dangerous and harder to catch.

Example:

For example, a cracker can install a key logger on another user's computer through Internet. A key-logger is software which records every typed letter on the keyboard. When the user uses Facebook and enters the Facebook account details, it will get recorded in the cracker's computer. Now, he can easily hack the Facebook account.

xiii. Differentiate between authentication and authorization.

Ans: Authentication:

Authentication means identifying a person based on a method such as Username and Password, Personal Identification Number (PIN), Access Card or Biometrics. It verifies who the person is.

Authorization:

Authorization means to give someone permission to do something.

Example:

For example when a user wants to login to his email account, he is asked to enter username and password to verify his identity. This is authentication.

If correct username and password are entered, the user is authorized or allowed to check his emails, send email or perform other tasks related with email service. This is authorization.

SECTION – C

Note: Attempt any TWO questions. Each question carries equal marks. **(2 × 8 = 16)**

Q3. a. What are the advantages of using networks?

Ans: Advantages of using networks:

The following are some common uses of networks.

Hardware Sharing:

Network allows sharing of computer hardware such as hard disk and printer. A hard disk can be attached to a server to share it with other network users. A single hard disk can provide storage space to many users A printer can also be connected to a computer to share it with all the other computer users across the network. Every user on network can use it for printing documents and there is no need to buy a printer for every user.

File Sharing:

A user of a network can easily share files with other users over the network. A user can place a file in a shared location on one computer and make it available to other users.

Users can access, view and modify information stored on another computer in the network.

Internet Sharing:

A single high speed Internet connection can be shared with all the users over a network. There is no need to provide a separate Internet connection to every user on the network.

b. Describe Client/Server and Peer-to-Peer networks.

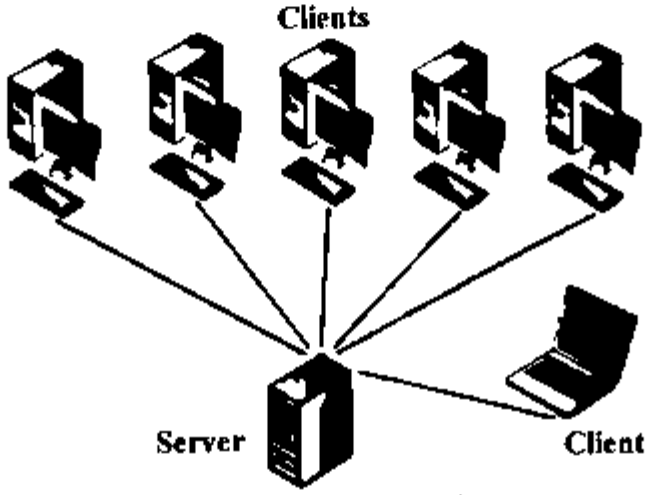
Ans: Client/Server Network:

A Server is a main computer in a network which is used to manage network resources and facilitates other computers.

Clients are computers in a network that access services made available by a server.

In a client/server network, each computer on the network acts as either a server or a client. Servers are not used as client computers and client computers are not used as servers.

In a client/server network, server shares its resources such as hard disk, printers and Internet connection with client computers. A client/server network is illustrated in Fig.



Client/Server Network

Characteristics of Client/Server Networks:

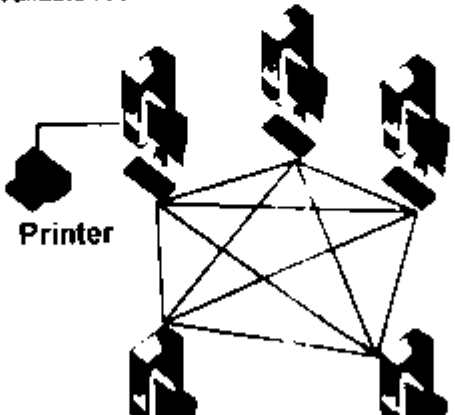
i) Client/server network can be as small as two computers and it can have hundreds and even thousands of computers as well.

ii) It provides centralized security to ensure that resources are not accessed by unauthorized users.

iii) In a client/server network, a person known as Network Administrator is responsible for sharing resources, creating user accounts and assigning privileges to all the users of the network.

Peer-to-Peer Network:

In Peer-to-Peer network all computers have the same status. Every computer is capable of playing the role of client, server or both at the same time. Each computer on the network is known as peer. A peer on the network can share as well as access available resources on the network. Peer-to-peer network is illustrated in Fig.



Characteristics of Peer-to-Peer Networks:

i) In a peer-to-peer network, each computer can play the role of server, client or both at the same time.

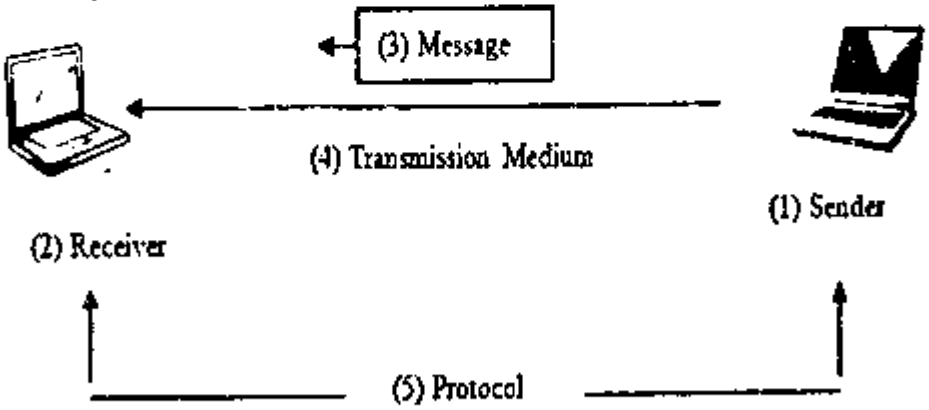
ii) Peer-to-peer networks are suitable for a small number of users, ranging between two to ten computers. Large peer-to-peer networks become difficult to manage.

iii) It does not provide centralized security. No single person is assigned to administer the resources of network. Individual users have complete control over resources of their computers.

Q4. a. Describe the components of communication system with the help of diagram.

Ans: Components of a Communication System:

Communication system consists of the following five basic components as shown in Fig.



Components of a communication system

- **Sender** - **Receiver** - **Message** - **Transmission Medium** - **Protocol**

Sender: It is the device which sends the message. In other words, it is the source of message that can be a computer, telephone handset, etc.

Receiver: It is the device which receives the message. In other words it is the destination of message that can be a computer, radio, telephone handset, etc.

Message: It is the data to be transmitted. It can be text, graphics, image, sound or video.

Transmission Medium:

It is the physical pathway (also known as channel) over which the message is sent from sender to receiver. Some examples of transmission media are coaxial cable, Fibre optic cable, microwaves, etc.

Protocol: It is the set of rules between the two communicating devices that governs the process of data communication. Without a protocol, two devices may be connected but they cannot communicate with each other.

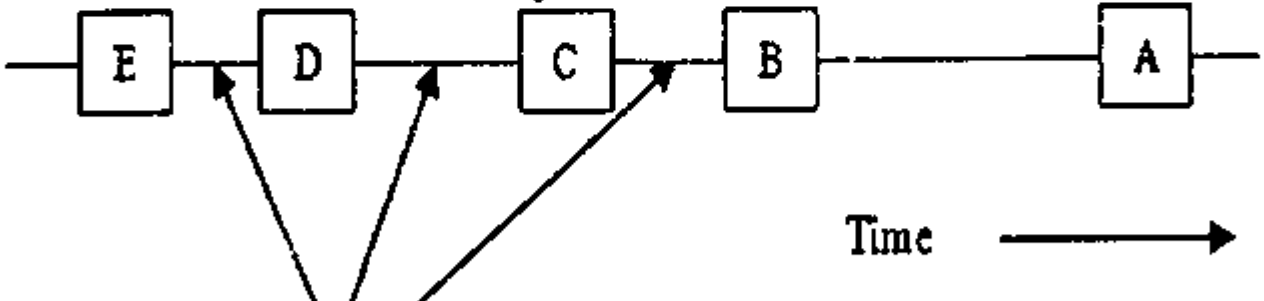
b. Explain asynchronous and synchronous transmission modes with examples.

Ans: Asynchronous and Synchronous Transmission modes:

Asynchronous and synchronous transmissions are the methods by which characters are transferred between components within the computer or between the computer and an external network.

Asynchronous Transmission:

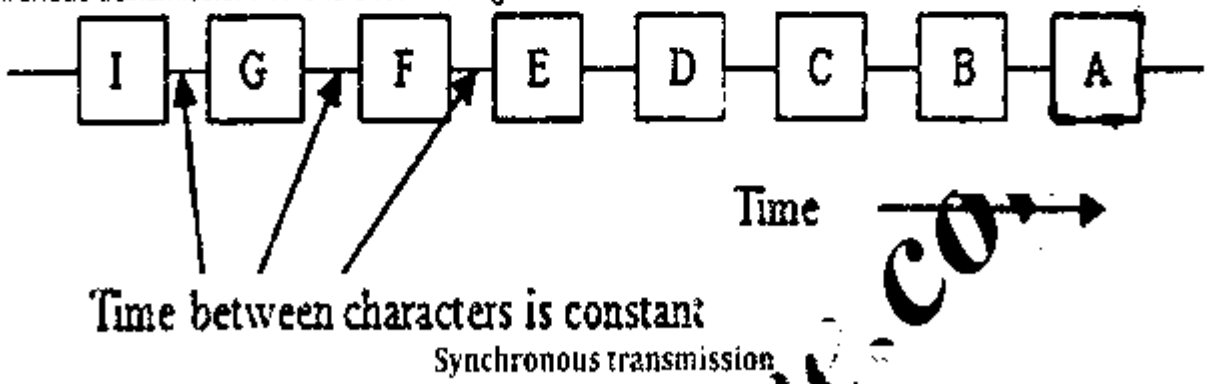
The transmission mode in which time interval between each character is not the same is known as asynchronous transmission. This is shown in Fig.



- In asynchronous transmission, each character is transmitted with additional control information. Control information consists of additional start and stop bits. Start bit indicates that transmission is about to start and stop bit indicates that it is about to stop.
- Start bit is generally 0 and stop bit is 1.
- Between the start and stop bits, the bits representing a character are transmitted at uniform time intervals.
- Asynchronous transmission is slow because of the additional bits transmitted with each character. It is suitable for low speed connection between system unit and keyboard or mouse.

Synchronous Transmission:

The transmission mode, in which time interval between the characters is always the same, is known as synchronous transmission. This is shown in Fig.



Synchronous transmission

- In synchronous transmission, there is no control information added with the characters
- Data consisting of 0s and 1s is transmitted as one long stream of bits. The receiver counts the bits as they arrive and recognizes the characters.
- Synchronous transmission is faster than asynchronous transmission because it does not require extra start and stop bits. Therefore, it is used for fast data communication between computers in computer networks.

c. Use appropriate formulae to determine the characteristics of a communication channel.

Ans: Characteristics of Communication Channel:

The maximum number of bits that can be transmitted over a communication line is a characteristic of transmission media. If more bits per second are transmitted than the line is capable of, some information will be lost due to transmission errors.

The baud rate can be calculated as:

$$Baud\ rate = Number\ of\ signal\ changes\ per\ second$$

The baud rate and data transmission rate measured as bits per seconds are not always the same.

For example, the Baud rate of a transmission line that uses modem is 28 kbps. If the electrical signal has two states to represent binary digits 0 and 1, then the Baud rate and data rate are the same.

If the electrical signal has four states to represent 00, 01, 10 and 11 as mentioned earlier, then Baud rate and data rate will not be the same

Data rate will be calculated as:

$$\text{Data rate} = 2 \times \text{Baud rate} = 2 \times 28 = 56 \text{ kbps}$$

Q5. a. Define computer ethics and write some important moral guidelines for ethical use of computer technology.

Ans: Computer Ethics:

Computer ethics means an acceptable behavior for using computer technology. It is a code of behavior for moral and social issues while using computer technology particularly Internet. Computer user should be honest, respect the rights of others on the Internet and obey laws that apply to online behavior.

We should not use bad language while chatting and social networking. We need to respect others views and should not criticize people.

Ethical Use of Computer:

The following are some important moral guidelines for ethical use of computer technology.

i. Computer should not be used to harm other people.
ii. Computer users should not break into others' computer systems to steal, change or destroy information
iii. Computer users should not read documents and e-mails of other users without their consent.
iv. People should not make illegal copies of copyright software and sell it for financial benefit.
v. Computer users who have special computer knowledge and ability should not create malicious software (such as computer virus) and spread it to other computers.
vi. People should not commit any type of crime with the help of computer technology.
vii. Computer users should respect the privacy of others

b. Describe some commonly committed cybercrimes.

Ans: Commonly committed cybercrimes:

The following are the commonly committed cybercrimes.

i. Computers have been involved in crimes such as fraud, kidnapping, murder and crimes related with stealing money from bank and credit card company
ii. Criminals use Internet to steal personal information of other users and commit various types of cybercrimes. Personal information includes username, password, credit card number, bank account number, etc.
iii. Downloading illegal software, music files and videos are also cybercrimes
iv. Internet harassment or cyber bullying is also a serious crime committed by cybercriminals. Internet harassment includes sending threatening e-mail, spreading rumors or virus, making defamatory comments, sending pornography or other bad material.
v. Making negative comments about an individual on Internet can damage reputation or cause physical or mental harm to the victim.